PULP & PAPER

JULY 1957

Capacity Figures to 1960
page 21

What to Expect in Paperboard
page 22

Weyerhaeuser's New Mill
page 38

Pulpwood on the move

. . . see page 83 for 1957
PULPWOOD ANNUAL

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Write for Bulletin A-156

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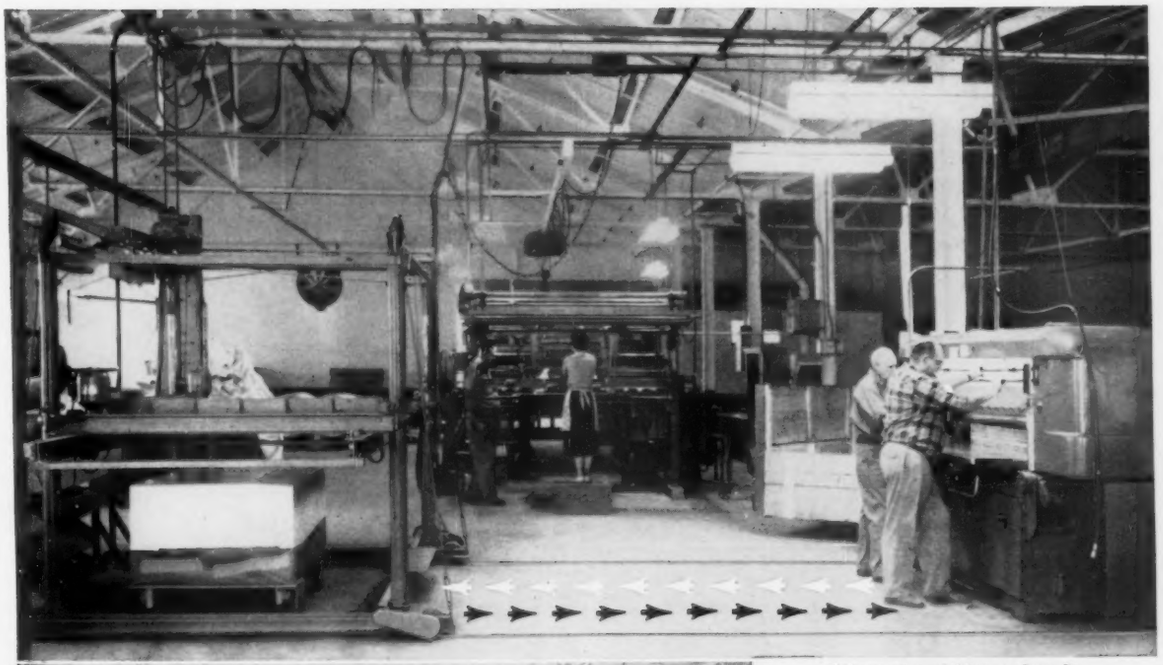
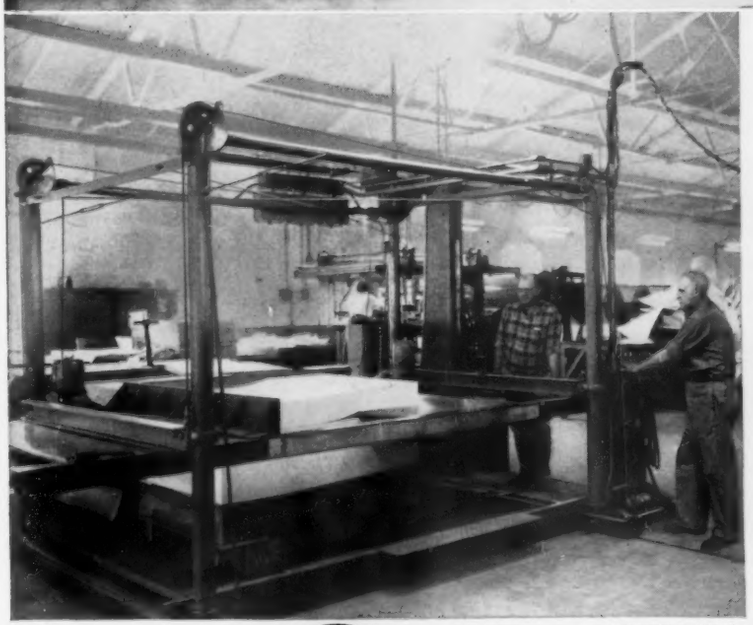


Photos courtesy of Kalamazoo Paper Co.



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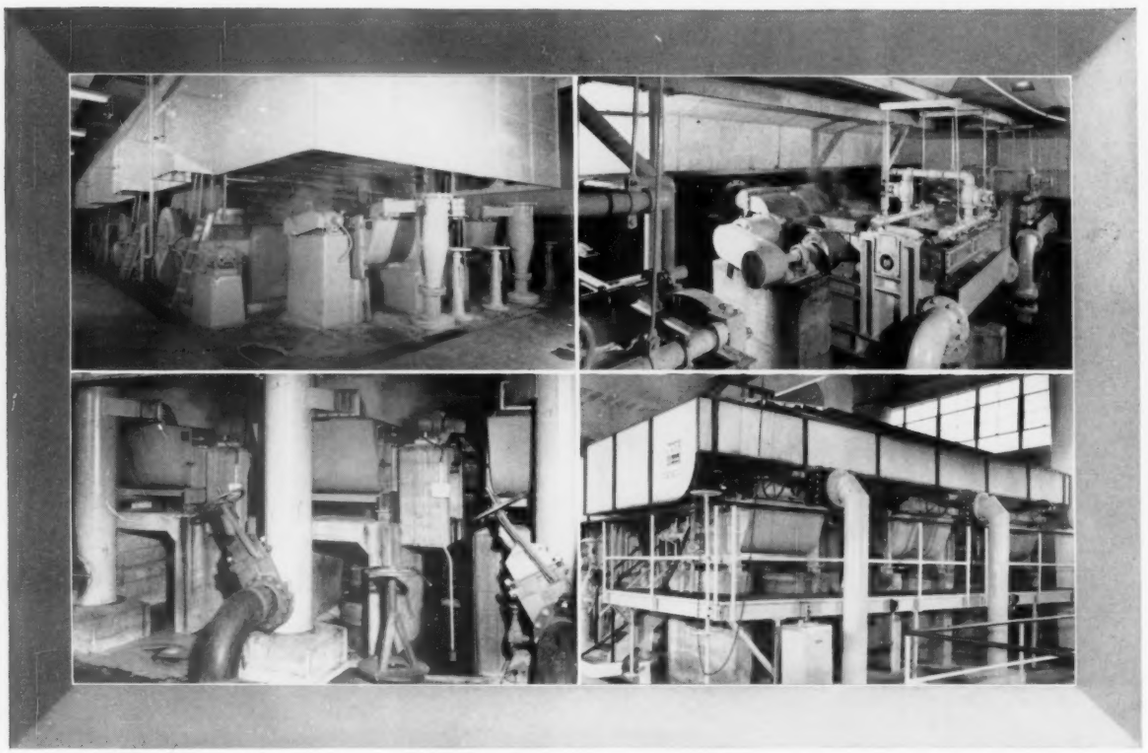

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PULP & PAPER

July 1, 1957

VOLUME 31
NUMBER 7

READER'S GUIDED TOUR

3,448,000 Ton Increase Projected in Paper 21
"Hush-hush" surveys prepared for U.S. Congress reveal anticipated capacities to 1960 for North American woodpulp and U.S.A. paper grades

What Paperboard Industry May Expect in the Next Year 22
Dr. Roos' report is cheering. Some "alarming" developments in pulpwood supply picture, also waste paper, are told. Woodpulp outlook is improving

Executives Conference at Appleton Told to Look for Boom in 1959 26
Growing pains still felt by Institute of Paper Chemistry. Strong plea is made for more basic research, ultimately of benefit to the paper industry

Coating Field is Growing Fast—Many New Problems Arising 30
Meeting in Milwaukee hears that coated printing papers have more than doubled in ten years; that trailing blade coaters are "hot"; that pulse of industry is good

Suggestion System That Works—A Brainstorming Demonstration 33
These were two highlights of annual National Convention of American Pulp & Paper Mill Supts. Assn. Another lesson at Chicago conclave—how to communicate.

Gearhart Delegates Hear of Way to Increase Production, Cut Costs 36
Slow fans, enclose dryer section to obtain production economies from existing machines, said one speaker, and savings will show 50% annual return on investment

What's New and Important about the New Weyerhaeuser Mill 38
A first-hand, illustrated report on unusual features and all significant details of the new Cosmopolis mill; each department of mill described. Special P&P pictures.

Some New Ideas Advanced for Safety at Southern Meeting 48

Pulp and Paper Sales and Earnings 22

Chlorine Dioxide Bleaching Discussed 50

● **PULPWOOD SECTION**

American Pulpwood Association PULPWOOD ANNUAL 83
Complete index of these articles will be found on page 85.

● **OTHER DEPARTMENTS**

The Editor Reads His Mail 5

Monthly Report 7

News from 'Round the World 11

Strictly Personal . . . news of people 150

Chemicals Column 160

New Equipment and Supplies 162

The Last Word—P&P Editorial Views 174
New staff assignments and faces; Tribute to R. S. Wertheimer

Thanks to Frank Heyward for Our Cover

It took months of planning and searching, keeping a weather eye out for the right spot, at the right moment, to get this picture which graces PULP & PAPER's cover page for this Pulpwood Annual issue.

The man who did the searching and planning was Frank Heyward, Jr., public relations director, Gaylord Container Div., Crown Zellerbach Corp., Bogalusa, La. Mr. Heyward, former U.S. forester, state forester, pulpwood specialist for the War Production Board, and successful tree farmer in his own right, knew what he was after.

This picture was taken in the largest privately owned man-made forest in North America—Gaylord Container's 155,587 acres of planted pines in southern Louisiana and Mississippi. These trees are 32 years old. They have been thinned three times, with 15 cords removed, and 40 cords per acre still stand. As far ahead as anyone can foresee, these men and their children will have work in these woods.

CIRCULATION DEPT., 500 Howard St., San Francisco 5, Calif. C. C. Baake, Circ. Mgr. Send subscription orders and changes of address to PULP & PAPER, above address. Include both old and new addresses.

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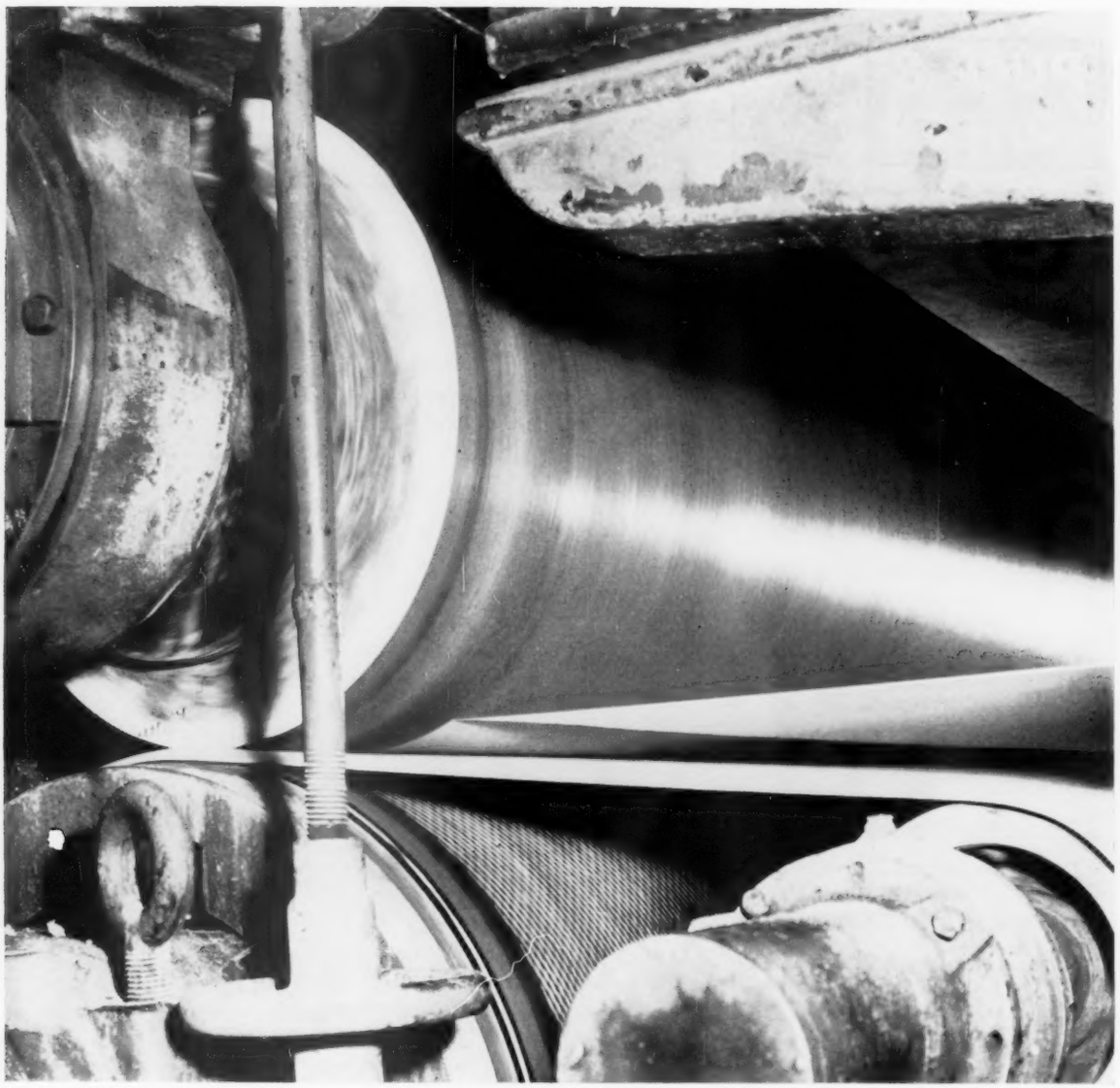

high production speeds depend on clean sheet release . . . like this

Perhaps the one most important quality sought in press rolls is the ability to release the paper web cleanly, and without any trace of picking or sticking. To insure this quality in the rolls which they buy, and to further insure other desirable features such as proper "nip", "cushion" and longer life on the machine, a majority of the country's leading mills and machine builders have learned to consult their Stowe-Woodward Sales Engineer.

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Anonymous letters will not be considered but names may be withheld if desired.

The Editor
PULP & PAPER
1791 Howard Street
Chicago 26, Illinois

THE EDITOR READS HIS MAIL

Experiences of Billy Welsh

William D. (Billy) Welsh, toastmaster par excellence or featured speaker at many pulp and paper industry affairs, public relations director for 16 years for Crown Zellerbach, and a leader of Keep America Green and American Tree Farm System programs, recently underwent a hernia operation.

—Port Angeles, Wash.

Editor: They dolled me up in single unit hip-length terry cloth ski boots, a white bra and rode me down the avenue, my attendant getting a receipt for me at the operating room door. Inside there it looked like a masquerade party as the reception committee members were thus gauzed on the Gauza strip. The surgeon said, "Good morning," the anesthetist said, "We're in business," and ten sodium pentathol drops later I sailed out the window into the sky blue yonder. Three hours later I awakened in the recovery room with three perfect strangers who weren't speaking. The nurse thumped my shoulder as though testing a watermelon and said, "This one looks O.K." So I was run through the checking stand and back into the elevator.

Actually, it wasn't bad at all. My cellmate was a jolly companion. Prior to his operation he asked the doctor whether he would be able to play a piano after the operation. The doctor assured him there was no reason why not. To which he replied, "Well, that's fine, because I've never been able to play it before."

BILLY WELSH

Suggests Substituting 'Employe Health' for 'Safety'

—Roanoke Rapids, N.C.

Editor: In regard to the article on the Safety Panel in your June issue concerning suggested changes in the terminology and method of recording accidents in our industry's safety program, I offer the following comments:

Mr. Dunning suggests that the "zero" of lost-time frequency as now being used is a negative approach. I maintain that the "zero" of lost-time frequency is positive just as, for instance, the "zero" deviation would be where a home budget were adhered to. Wherever "zero" refers to lack of deviation from something that is desirable—in this case a "no accident record"—then, in my opinion, the "zero" becomes positive in nature and not negative as he has suggested.

As for Mr. Bundy's suggestion to substitute some other terminology for the word "safety" in these programs, I do feel that this suggestion bears further consideration but not exactly from the standpoint that Mr. Bundy has suggested.

It seems to me that the true object of our safety and accident-injury prevention programs is to keep the employe on the job. There are many influences which can keep an employe away from his job such as industrial injuries, home injuries, automobile accidents, sickness, etc. If this is true, then it naturally follows that these programs should be more properly pointed to total health education of the employe, which would include, of course, accident and injury prevention. Two years ago we started a modest educational addition to our so-called "safety program" which includes general health education, and this year we even carried some of it to our employes' wives and dependents. Might I suggest that we substitute "employe health" for the word "safety," which would include, as I have indicated above, all of the facets we should probably be covering in these programs?

I noted that one panelist suggested emphasizing injury prevention with corresponding de-emphasis being placed on accident prevention. I cannot go along with this idea, for we believe that, in general, the prevention of accidents is tantamount to prevention of injuries in industrial phases of our "employe health" programs.

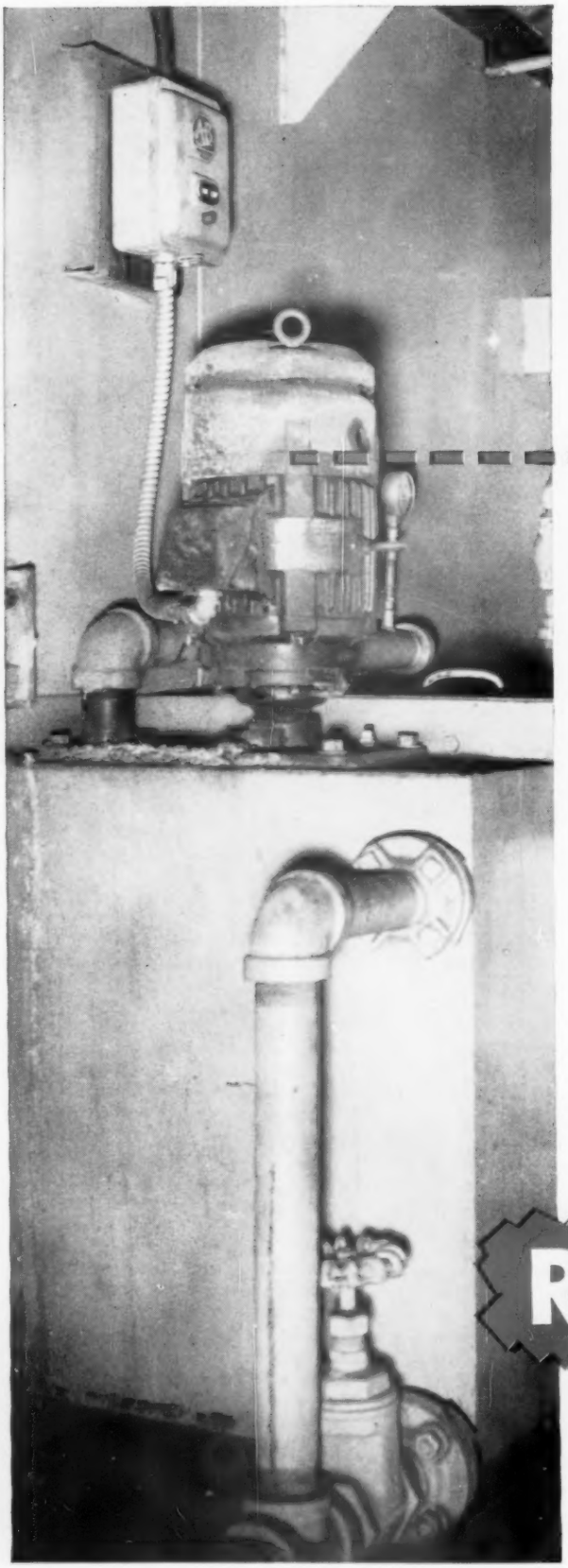
H. W. ELLERSON, JR.
General Superintendent,
Halifax Paper Co., Inc.

An Invitation

—Düsseldorf, West Germany

Editor: Your readers are cordially invited to the International Congress and Exhibition of Measuring Instrumentation and Automation. IKAMA is scheduled for Nov. 2-10, 1957 at Düsseldorf. The Exhibition will comprise the following fields: Measuring, telemetering and control instruments for electrical and processing quantities as well as analytical equipment for production control and research. Promoters are the respective trade associations.

Nordwestdeutsche Ausstellungs-Gesellschaft m.b.H.
(NOWEA)



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solves motor corrosion problem

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PULP & PAPER # Monthly Report ... of significant news and views

WHERE PAPER HELPS TO SELL . . . Nationwide survey reveals supermarkets capture 62% of total food retail sales. Sales for all food stores reached a new high of $42.5 billion in 1956, up 7.8% over 1955. But net profits failed to keep pace.

CAPITAL EXPANSION PROGRAM PROGRESSES . . . Construction is on schedule at International Paper Co.'s new Pine Bluff, Ark., mill. Two machines, one for newsprint and the other for bleached kraft board, should begin production before end of year. An I.P. shipping sack plant is under construction at Litchfield, Ill. Work will start soon on a container plant at Fond du Lac, Wisc.

CHILLICOTHE SOON TO HAVE NEW MACHINE . . . Chillicothe Paper Co. division of The Mead Corp. is aiming for November completion of its $8,000,000 expansion, including a new No. 4 Rice Barton Fourdrinier machine with a 188 in. wire, to make offset and papeteries. A new stainless steel Dilts Hydrapulper and E. D. Jones & Sons Fibremasters metered on machines Nos. 3 and 4, and new storage and shipping areas are to be completed.

"WE DON'T BUY FOOD—WE BUY THE BOX IT COMES IN," say supermarket customers. Cheese, butter, ice cream and many other foods sales have been raised by use of attractive packages. Michigan State U. now offers a four-year course in packaging and a growing list of other schools, such as Rutgers U., Stevens Institute of Technology and Illinois Institute of Technology, give shorter courses.

TO MAKE MILK CARTONS . . . Potlatch Forests, Inc., Lewiston, Ore., completed a license agreement with Ex-Cell-O Corp., Detroit, Mich., under which PFI will manufacture "gable top" milk cartons, using paperboard tonnage from a new No. 2 paperboard machine which started in February.

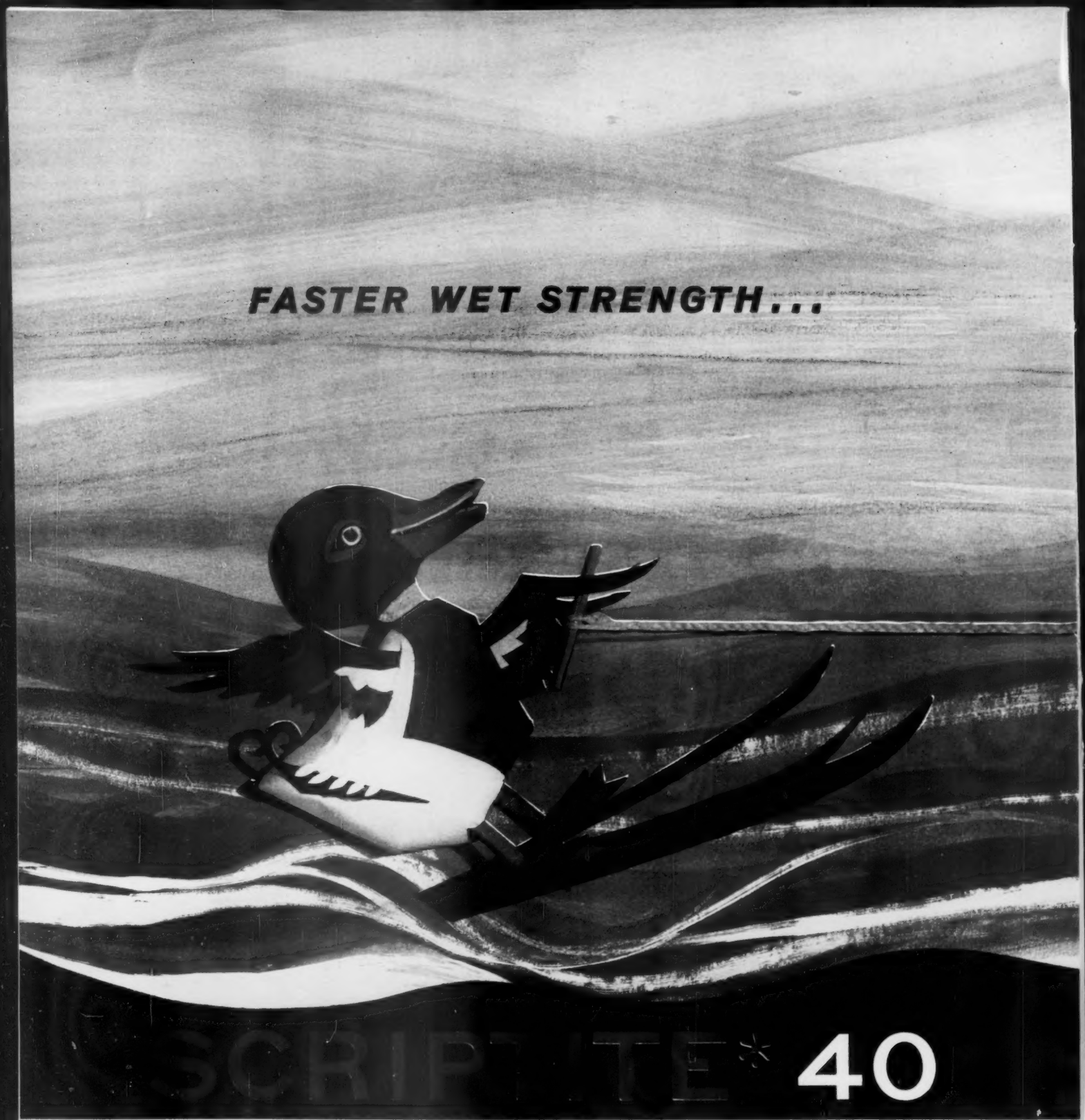
"WE'LL MAKE MORE NEWSPRINT—AND WE EXPECT TO SELL IT!" says Sir Eric Bowater, chairman, The Bowater Paper Corp. Ltd. Specifically, by 1959, Bowaters expects to make 1,000,000 tons a year in North America alone. The firm's North American plants made 340,000 tons in 1953, 570,000 tons in 1955, and plan 875,000 tons in 1957. In 1956, U.S. consumption was just short of 7,000,000 tons.

NEW TYPE OF RECOVERY PLANT . . . A new type of semi-chemical pulp liquor recovery plant is being installed by Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. If successful, the $500,000 experimental plant will be expanded to process all collectible spent sulfite liquor. It incorporates a process developed by Western Precipitation Corp., Los Angeles. Boiler is by Babcock & Wilcox.

WILL SPEND $7,500,000 DURING NEXT THREE YEARS . . . The Gardner Board and Carton Co. announces plans to expand and improve plants in Middletown and Lockland, Ohio, at a cost of $7,500,000. Both plants will get new buildings to house additional equipment and a new plant is planned for the Manchester Machine Co., Middletown, a Gardner subsidiary.

FIRST QUARTER PROFITS UP 28% . . . Stone Container Corp., Chicago, Ill., reports net income in first three months of 1957 was 28% higher than corresponding period of 1956, even though net sales were down slightly. This reverses a current trend of profits decreasing, even when sales increased, because of high costs. Earnings of West Virginia Pulp & Paper Co. for first half of its fiscal year dropped 36% from year-ago record, even though the decline in sales was relatively minor.

Please turn page for more



a new concept in cationic urea-formaldehyde paper resins

In mill trials on unbleached and bleached kraft towelling, napkin stock and facial tissue, Scriptite 40 demonstrates a high degree of wet strength, off-the-machine and after natural aging. With minimum resin add-on high wet strength values are produced. Scriptite 40—a cationic urea-formaldehyde—also improves dry tensile, stiffness, mullen, wet rub resistance, folding endurance, internal sizing and pick resistance.

Evaluate Scriptite 40 in your operations. For samples, technical data and complete technical assistance, write to Monsanto Chemical Company, Plastics Division, Paper Resins Dept., Room 1900, Springfield 2, Mass.

*SCRIPTITE: REG. U. S. PAT. OFF.

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SCRIPTITE 54 ... *for outstanding water resistance and both wet and dry rub resistance.*

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SCRIPTITE 50 ... *for unsurpassed printability and improved surface characteristics on boxboard.*

SCRIPTITE 33 ... *a melamine wet-strength resin.*

continued

FORECAST INCREASED PROSPERITY . . . Government and industry leaders at a meeting of Commerce Dept.'s Business Advisory Council said they expect business activity to rise steadily between now and end of the year.

BLEACHING AT HINTON . . . Top grade bleached sulfate pulp shipments are now being made by North Western Pulp & Power Ltd. at Hinton, Alta. Alberta's first pulp mill actually started up on unbleached pulp in late April.

NEWSPRINT CAPACITY TO INCREASE 1,395,000 TONS BY 1959, an industry survey revealed. Survey was made by new Newsprint Information Committee organized by Canadian newsprint producers, and includes all North America.

SPENDING FOR EXPANSION UP IN FIRST QUARTER . . . Businessmen approved $4,700,000,000 for new capital spending during first quarter of 1957, compared with $3,100,000,000 in last quarter of 1956. Cancellations which rose steadily last year to a high of $221,000,000,000 in the last quarter, dropped to $134,000,000,000.

FIRST CANADIAN HARDWOOD PULP MILL . . . A $3,000,000 hardwood pulp mill built by a new firm, St. Malo Pulp and Paper Co., is expected to start up in Sept. It will be the first of its kind in Canada.

CONSIDERING EXPANSION INTO EASTERN CANADA . . . Westminster Paper Co., subsidiary of Scott Paper Co., is considering installing equipment, made available by shutdown of Scott's Glens Falls, N.Y., mill, in Quebec, possibly at Berthierville, about 35 miles northeast of Montreal.

NEW BLEACH PLANT STARTS UP . . . Elk Falls Co.'s new bleach plant at Duncan Bay, B. C., went into production in May, processing part of the new sulfate pulp mill's output which previously was shipped almost entirely in noodle form to Crown Zellerbach's new kraft operation at Antioch, Calif.

WILL USE 75,000 LBS. OF STAINLESS STEEL . . . St. Croix Paper Co., Woodland, Me., which is putting in a new Beloit newsprint machine, is receiving delivery of $130,000 of stainless steel fabrications from Portland (Me.) Copper and Tank Works, Inc. Shipment includes stock and white water feed lines, four miles of piping—in all, 75,000 lbs. of stainless, primarily grade 304, with some 136 and ELC. Chas. T. Main, Boston, Mass., is engineering contractor.

NEW MACHINES, NEW PLANTS . . . As this issue went to press, a new Black Clawson machine in the new paperboard mill of Container Corp. of America at Santa Clara, Calif., was evidence of growing markets on Pacific Coast, where biggest population influx is taking place . . . Great Lakes Paper Co., Fort William, Ont., started up a new 272 in. Black Clawson Fourdrinier newsprint machine in early June. A second machine, to be world's biggest, will start up in the fall . . . The Naheila plant of Marathon Southern Corp., Demopolis, Ala., is expected to begin production in May, 1958. . . . The first phase of a five to six year program to increase Crown Zellerbach's Gaylord Div. shipping container production by more than 50% was begun May 1, with startup of $3,000,000 Gaylord corrugated box plant at Antioch. Gaylord Dallas plant will be relocated and expanded. New plants will be constructed in metropolitan centers. . . . St. Joe Paper is building a new container plant in Houston.

Major chemical producer meters flow of catalytic agents with Cleveland Speed Variator

A chemical research worker adjusts the manual control knob on the Cleveland Speed Variator to set the metering speed. Various types of regulating mechanisms can be mounted on the Variator to provide automatic adjustment by remote control.

HOW IT WORKS

Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts. Relative speeds of the shafts are adjusted by changing the positioning of the axles on which the balls rotate (see cutaway view, left).

IN the research department of a major chemical plant, catalytic agents are metered and their flow varied with precision accuracy. This control is exercised with a Cleveland Speed Variator.

A ¼-horsepower electric motor is connected to the Cleveland Speed Variator driving a pump through a 25-1 speed reducer. Being infinitely variable, the Variator gives stepless speeds over its full 9:1 range—from ⅓ to 3 times input speed. Pumping speed can be varied from 207 to 23 rpm. This provides the necessary speed range for metering the various types of catalytic agents.

Available in eighteen standard types and sizes, the Cleveland Speed Variator offers these major advantages: 1. An extremely compact unit; 2. Almost any input speed up to 1800 rpm—clockwise or counterclockwise; 3. Constant horsepower output over a 9:1 range, or constant output torque with a 6:1 range; 4. Infinitely variable over entire speed range; 5. Rapid response to speed change, precise adjustment, accurate maintenance of settings; 6. Long life and minimum maintenance; 7. Ample bearing support for overhung pulleys on either input or output shafts.

Write for Bulletin K-200 for detailed description of the Cleveland Speed Variator, with photographs, sectional drawings, rating tables and specifications.

THE CLEVELAND WORM AND GEAR COMPANY

Speed Variator Division, 3268 East 80th St., Cleveland 4, Ohio

Sales representatives in all major industrial markets. In Canada—Peacock Brothers Limited.

Machines for Red China . . .
London . . . Wartsila-koncernen A.B. of Finland is building two 173-in. paper machines for Red China, each with vacuum pickup transfers and speed ranges of 660 to 1,640 fpm. News reached here when the Finnish concern ordered Harland sectional electric drives for both.

Rayon Pulp from Blue Gum . . .
Dehra Dun, India . . . For first time in India, viscose rayon pulp has been made in India from native blue gum. Laboratory pulp was made at the Forest Research Institute by prehrolysis-sulfate process, yield 42%. A German rayon firm approved the pulp.

Significant Technical Events In Europe and Japan

PULP & PAPER presents here several abstracts of significant publications from Europe and Japan, reproduced by permission of the Institute of Paper Chemistry. These were specially selected from a large number of abstracts of papers as being most significant. They discuss new techniques of bleaching, new instruments, methods for machine speed-up, etc.

Photostats and/or translations of these articles may be obtained by writing Eugene Bunker, librarian, Institute of Paper Chemistry, P.O. Box 498, Appleton, Wis., U.S.A. Abstracts are by Curtis L. Brown, editor, B.I.P.C. Bulletin, Inst. Paper Chem.

Bleaching . . . ANDERS, WOLFGANG. Bleaching of pulps with bromine. Zellstoff u. Papier 4, no. 9: 257-61; no. 10: 291-301 (Sept., Oct., 1953) [In German; English and Russian summaries] Bull. Inst. Paper Chem. 27: 924 (1957).

The compositions of aqueous bromine and chlorine solutions at various pH values are contrasted. At pH 7-9, bromine solutions contain considerable amounts of free bromine, whereas chlorine solutions contain only hypochlorite ions in this pH range. For mild pulp bleaching with chlorine, a pH above 8 is required; at lower pH values, the high oxidation potential of hypochlorous acid causes considerable fiber damage. On the other hand, the hypobromic acid in bromine bleach liquors is less injurious at pH 6-9, owing to the incomplete hydrolysis of bromine. The joint presence of bromine and hypobromite permits simultaneous halogenation and oxidation in a single step. The shift of pH values during bromine bleaching experiments in the laboratory is discussed. Bleaching of spruce sulfite pulp with aqueous bromine requires only one fifth to one sixth the time necessary for analogous chlorine bleaching. The development of brightness is similar in both processes, about 4% active bromine being required for maximum brightness. A single-step bromine treatment in the acidic range is not practical because of low whiteness content. A pH of 7-10 is likewise unsuitable because of low whiteness, strong decomposition of the bleach liquor, longer treatment time, and significant fiber damage. A single-step bromine bleach is feasible only in the strongly alkaline pH range but involves considerable losses in strength properties. A two-step process with bromine water and alkaline hypobromite yields whiteness contents up to 87% for a total active bromine concentration of 5-5.5%, of which about 35% should be applied in the first step. Bleached pulp yield is about 97%. Similar results are obtained in a mixed two-step process, using acid chlorination (2% active chlorine) and alkaline bromination (6% active bromine). 38 tables, 8 graphs, and 17 references.

Bleaching . . . OGAWA, KEN-ICHI, and JODAI, YUKIO. Effects of chlorite bleaching on D.P. distribution of wood pulp. J. Japan. Tech. Assoc. Pulp Paper Ind. 11, no. 2: 122-5 (Feb., 1957). [In Japanese; English summary] Bull. Inst. Paper Chem. 27: 925 (1957).

Using the summative fractionation method and cupriethylenediamine as solvent, the D.P. distribution of kraft samples (semibleached, chlorite-bleached, and hypochlorite-bleached) was determined. Although chlorite bleaching somewhat shortens the chain lengths of cellulose, the D.P. distribution curve of chlorite-bleached samples resembled those of the original semibleached pulp, whereas hypochlorite bleaching caused considerable degradation of the higher D.P. fraction. 8 tables, 5 diagrams, and 5 references.

Instrumentation . . . VÁMOS, GEORG, and PÁSZTOR, EUGEN. Measuring instruments for increasing paper machine production. Zellstoff u. Papier 6, no. 2: 33-9 (Feb., 1957). [In German] Bull. Inst. Paper Chem. 27: 956 (1957).

The construction and operation of several Hungarian instruments for controlling the continuous production of paper machines (velocity meters and cylinder-surface thermometers) and the technological properties of the paper (selsyn motor, fiber-loss indicator, moisture meter, thickness meter, area meter, and continuous area-weight recorder) are described. The principles and advantages of instrumentation and automation in general are mentioned. 15 figures.

Cellulose-Sorption . . . SCHWERTASSEK, KARL. On coloration and forces causing the sorption of iodine on cellulose and acetylcellulose fibers. Faserforsch. u. Textiltech. 8, no. 2: 65-9 (Feb., 1957. [In German; Russian and English summaries] Bull. Inst. Paper Chem. 27: 934 (1957).

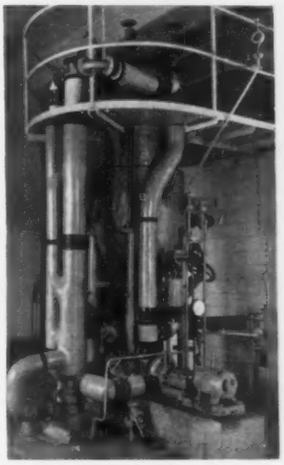
Similar to starch, cellulose and probably also acetylcellulose take up iodine by adsorption. Poor crystallizability in iodine-sorption compounds of cellulose seems to be indicated by a brown coloration, good crystallizability by a blue coloration (cellulose hydrate). Crystalline cellulose seems to adsorb iodine with formation of a weak blue or weak violet color. Since cellulosic fibers generally contain all three kinds of celluloses, the iodine reaction may give different colorations on the same fiber, depending on experimental conditions. 1 table and 9 references.

Cellulose Reactivity . . . ROGOVIN, Z., and DEREVICKAYA, V. Examination of relative reactivity of cellulose hydroxyl groups during methylation. Faserforsch. u. Textiltech. 8, no. 2: 61-4 (Feb., 1957). [In German; Russian and English summaries] Bull. Inst. Paper Chem. 27: 932 (1957).

By preparing partially methylated celluloses and determining the position of the methyl groups in the glucose units it is shown that secondary hydroxyls are essentially more reactive than primary hydroxyls. 4 tables.

Folding Test . . . TROGER, HORST. The foldability of Presspahn. Zellstoff u. Papier 5, no. 1: 12-13 (Jan., 1956). [In German] Bull. Inst. Paper Chem. 27: 926 (1957).

A new simple instrument for determining the folding resistance of Presspahn is described. According to a recent German standard, Presspahn must not show visible cracks when bent on both sides by 180° in thicknesses up to 1 mm., nor when bent once by 100° in thicknesses of 1-5 mm. The new folding tester is well suited for determining whether Presspahn for electrotechnical purposes corresponds to this specification. 1 illustration and 1 reference.



For Sulfite Pulping in Spain
Experimental digester in Spain's Forestry Institute of Investigations and Experiments is used for bi-sulfite process.

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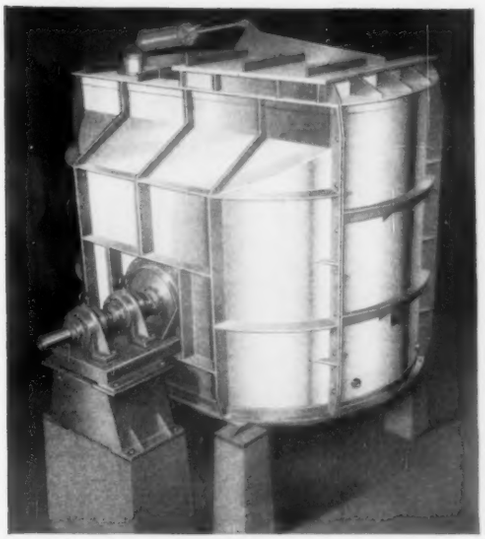
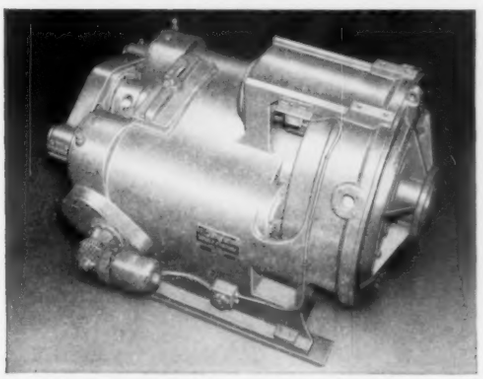
E.D. Jones HI-LO PULPER



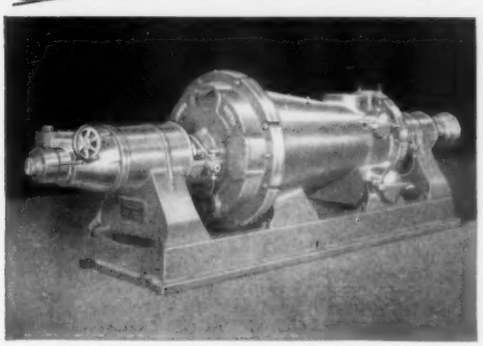
Engineered to eliminate the compromise imposed by conventional single-rotor pulpers between maximum circulation and complete defibering, the HI-LO employs two separately powered rotors to provide maximum pulping *and* complete defibering, with significant savings in time and power. For details, ask for Bulletin EDJ-1063.

E.D. Jones DOUBLE-D REFINER WITH DOUBLE EQUA-FLO EFFECT



The only unit of its kind with *two stages of refining* in one machine, the Jones Double-D can actually do twice the work of conventional refiners because it has double the refining area — 2200 square inches in the 42″ model; produces stock of equal or better quality at a considerable saving in operating cost. Ask for Bulletin EDJ-1083.

E.D. Jones ROYAL JORDAN



Like all Jones Jordans, the Royal incorporates exclusive Jones features developed in more than a century of service to paper mills. In addition, the Royal, a war-born unit developed originally to process nitrocellulose has some special features worth investigating. Ask your Jones representative or write for Bulletin EDJ-1007B.

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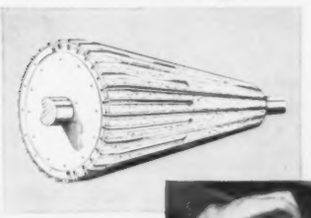
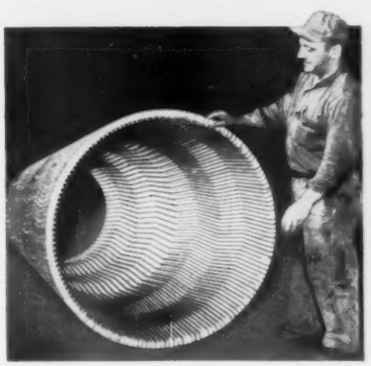
E.D. Jones® Adapta-Plug



Strongest plug design yet developed, this new completely bandless Jordan plug is easiest to strip and fill. New, improved design holds bars firmly in place, eliminates hazards of slot wear and corrosion. Available in solid plug — or sleeve form for easy conversion of old worn plugs. Write for Bulletin EDJ-1094.

E.D. Jones® FULBAR SHELL FILLINGS



A complete one-piece assembly, made to fit the shell body of any Jordan. No keys or wedges. Fulbar rigidity and one-piece construction compensate for inequalities in old Jordan shells — save hours of installation time. Many other new advantages make this the ideal shell filling. Write for Bulletin EDJ-1094 and names of satisfied users.

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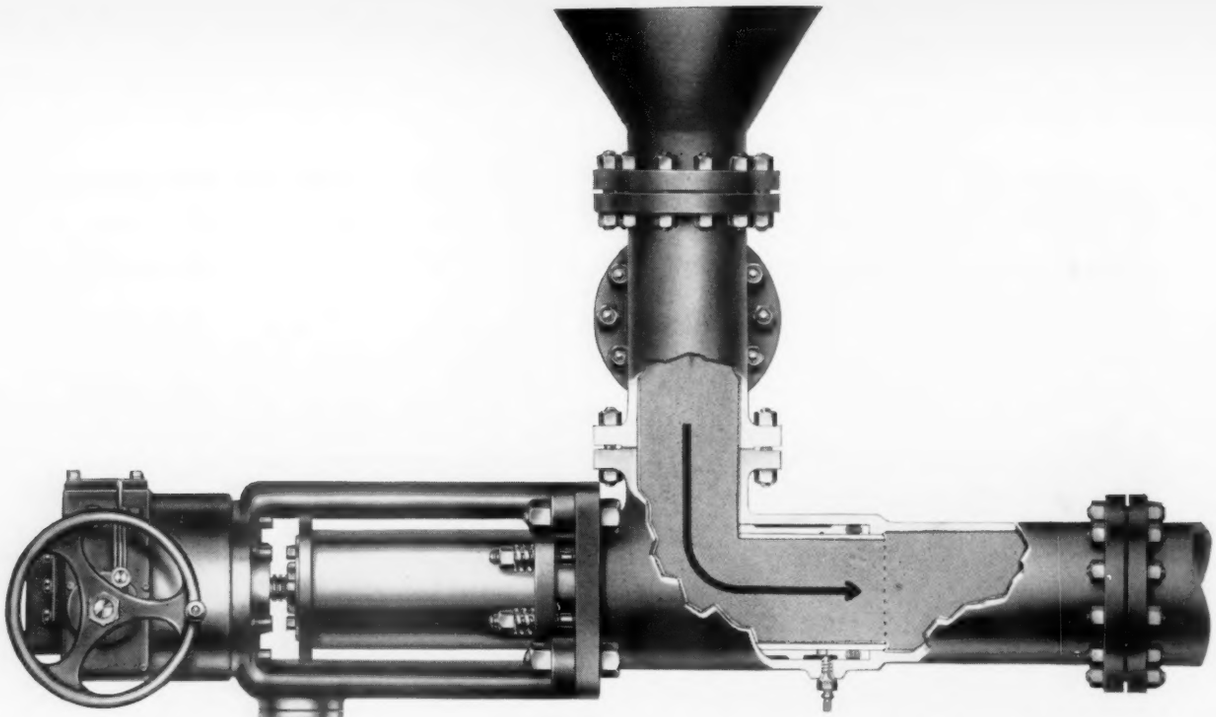
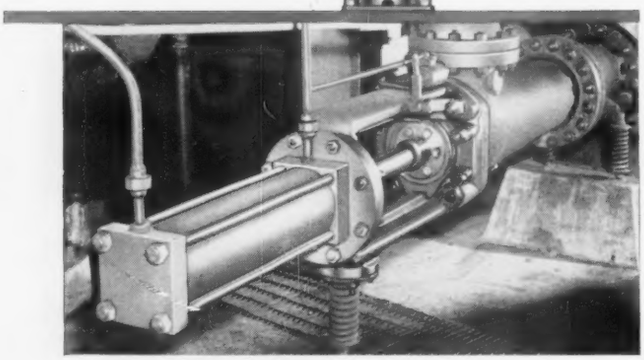
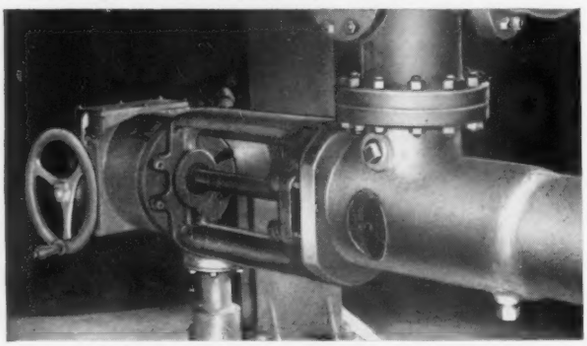


full, free digester discharge



HYDRAULIC-OPERATED Yarway Digester Blow Valve—one of six installed at large North Carolina paper mill.



MOTOR-OPERATED Yarway Digester Blow Valve—one of eight installed at large Canadian paper mill.

Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show more discharge area . . . reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.

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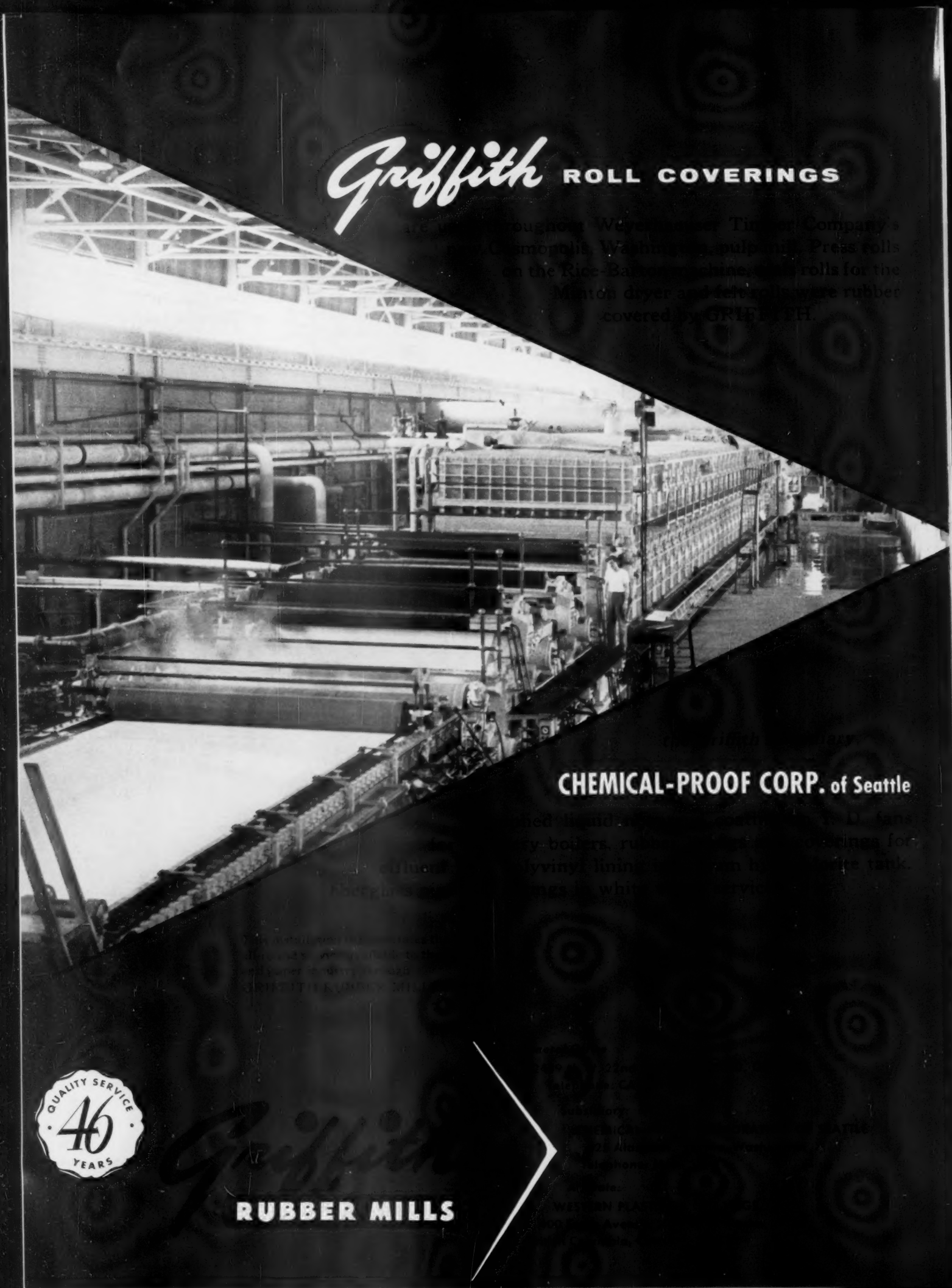
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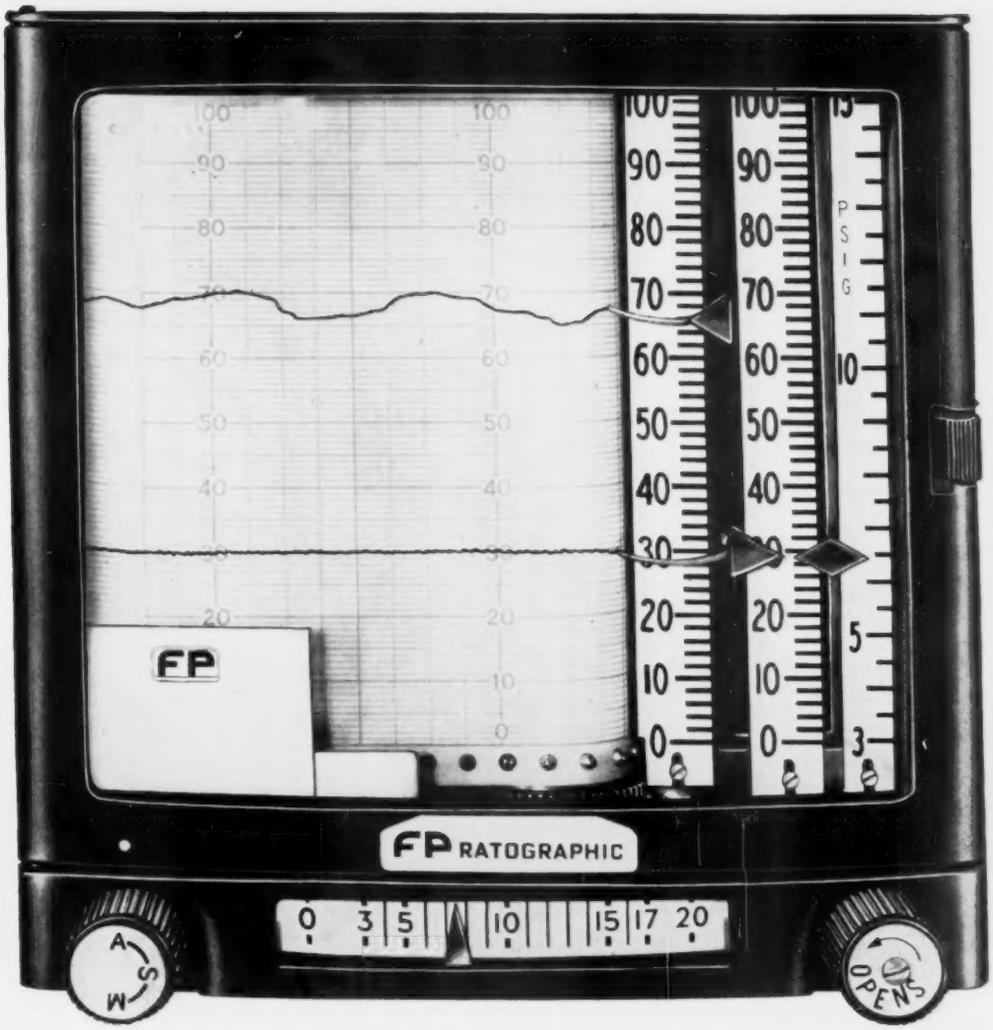

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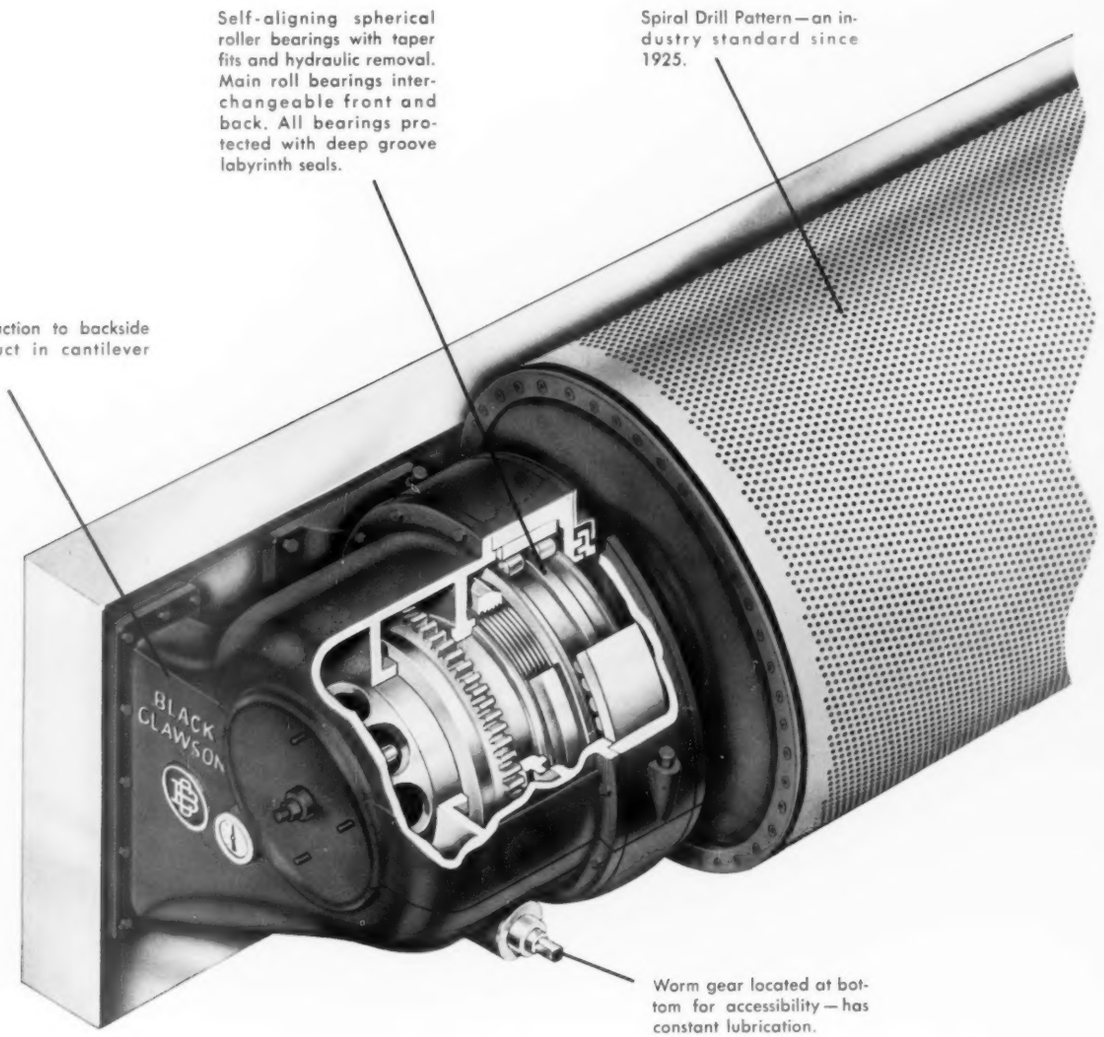
Black-Clawson Suction Rolls


Self-aligning spherical roller bearings with taper fits and hydraulic removal. Main roll bearings interchangeable front and back. All bearings protected with deep groove labyrinth seals.
Spiral Drill Pattern—an industry standard since 1925.
Front suction to backside thru duct in cantilever beam.
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Worm gear located at bottom for accessibility—has constant lubrication.

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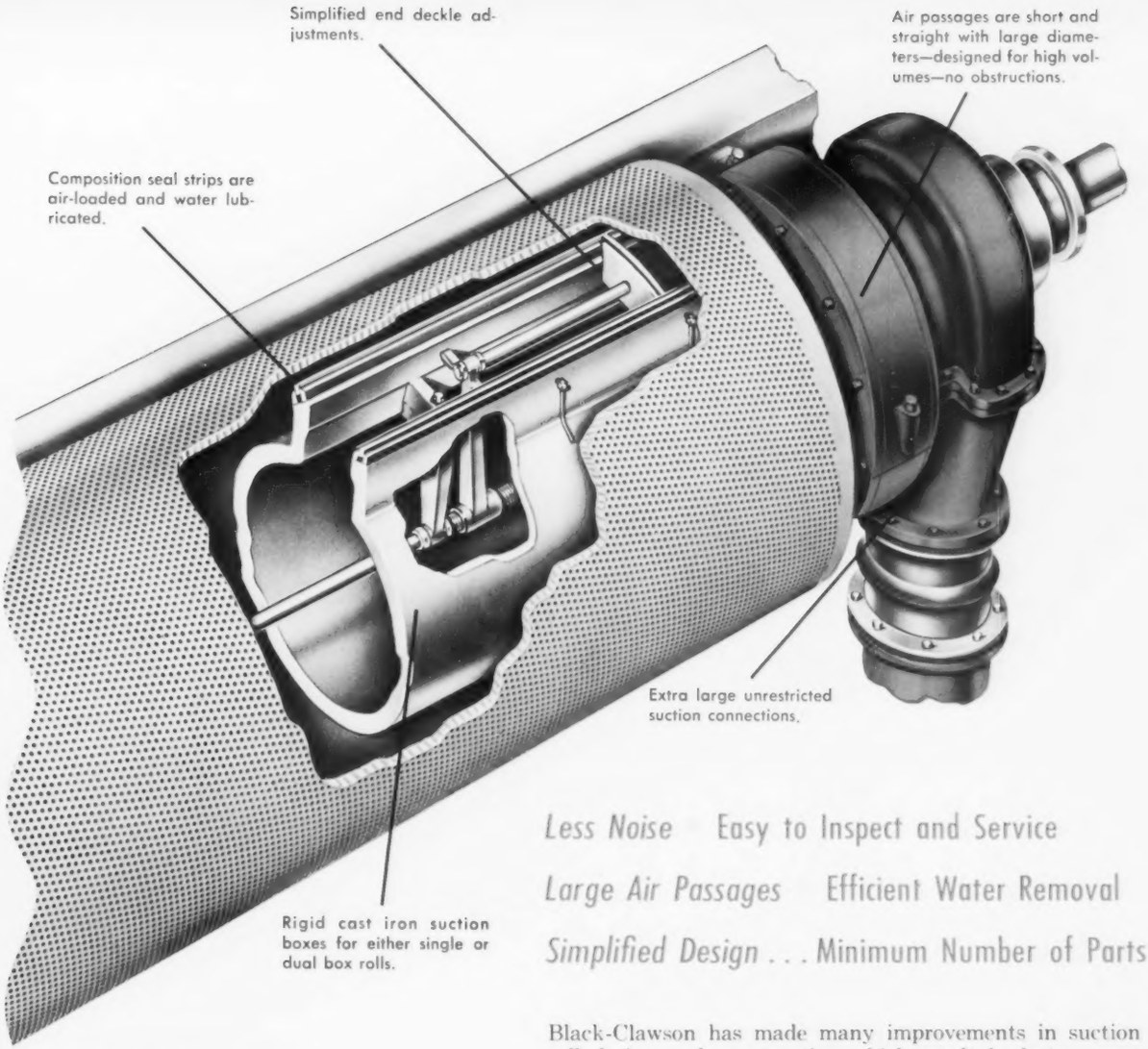
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Extra large unrestricted suction connections.
Rigid cast iron suction boxes for either single or dual box rolls.

Illustration shows suction couch roll mounted on end cantilever beam of a Black-Clawson Hydroflyte Fourdrinier.

Less Noise Easy to Inspect and Service

Large Air Passages Efficient Water Removal

Simplified Design . . . Minimum Number of Parts

Black-Clawson has made many improvements in suction roll design and construction which result in faster, more efficient water removal at less cost. Many of these modern features are exclusive with Black-Clawson.

The proper application of Black-Clawson suction rolls at certain points in a paper machine will help increase machine speed, production and simplify operational problems. Experienced suction roll engineers at the Paper Machine Division can analyze your specific requirements and show you how to best utilize standard or modified suction rolls on your new and existing machines.

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230 Park Avenue, New York 17, N. Y.

3,448,000 Ton Increase Projected in Paper

Figures discounted as some plans are pigeon-holed; pulp rise of nearly 8,000,000 tons ('56-'60) is listed.

U.S.A. WOODPULP
(In short tons)

	Increase 1/56-1/60	Total 1960
Dissolving	349,155	1,462,014
Sulfite paper grades	245,145	3,086,184
Sulfite bl. capacity	342,020	2,588,822
Kraft paper grades	3,339,747	15,509,830
Kraft bl. capacity	1,592,755	5,848,811
Semichemical	659,409	2,607,188
All U.S. woodpulp	5,723,111	29,372,985

U.S.A. PAPER
(In short tons)

	Increase 1/56-1/60	Total 1960
Newsprint	938,000	2,469,000
Uncoated book	382,000	2,062,000
Machine-coated book	582,000	1,850,000
Tissue-sanitary	228,000	2,066,000
Coarse	371,000	4,284,000
Fine	464,000	1,989,000
All U. S. (incl. other paper grades)	3,448,000	18,905,000

NORTH AMERICAN WOODPULP
(In short tons)

	Increase 1/56-1/60	Total 1960
Total chemical and semichemical	5,808,680	29,044,124
Dissolving	531,235	2,130,534
Sulfite paper grades	379,459	5,696,505
Sulfite bl. capacity	364,874	3,264,762
Kraft paper grades	4,188,203	17,845,835
Kraft bl. capacity	2,243,299	7,217,637
All North Am. (incl. others)	7,835,096	42,439,269

"Hush-hush" surveys of future North American pulp and U.S.A. paper grades capacities to 1960, prepared for U.S. Congress, have been revealed. Not as startling as some had feared, because:

1. Many executives already knew and were making adjustments.

2. Many projects included in figures have been pigeon-holed until demand catches up—experts say end of 1958.

3. Figures are for "all-out" demand, must be discounted. For example, trim 1,300,000 tons from total 1960 U.S. paper capacity to get normal 310 working-day year figure.

Paperboard figures were still being held up at Washington, D.C., when these came out. They are expected to show a somewhat slower expansion pace than paper—about 500,000 tons less increase by 1960. If paper capacity goes over 18,000,000 tons by 1960, you can bet paperboard will reach around 18,000,000. Knock off a million tons for normal—not "all-out"—operation.

Just before these figures were released by APPA and U.S. Pulp Producers, Al B. Layton, president of Crown Zellerbach, said "new industry capacity actually scheduled to come into production by 1960, as measured by a recent survey, is substantially less than indicated earlier. When this study is released we expect it will show expansion of less than 14% in capacity (by 1960) . . . previous estimates were about 3,000,000 tons or 60% higher. There will be a continuing strong and growing demand for paper, as indicated by another authoritative study. When released, we expect this to confirm our estimate that demand for paper will increase more than 11% between 1956 and 1960 . . . this is a very conservative estimate."

Representative Pulp and Paper Companies Sales and Earnings – First Quarter 1957

	Net Sales (000)	Income Bef. Taxes (000)	% of Sales	Net Income (000)	Net Per Share
MARKET PULP (Also Lumber, etc.):					
Puget Sound Pulp & Timber	$ 6,341	$ 1,516	24%	$ 728	$0.31
Rayonier, Inc.	30,043	3,181	11	1,976	0.36
MacMillan & Bloedel Co., Ltd. (Fiscal yr 9/30)–(2nd Qu.)	41,641	3,589	9	1,903	0.36
Weyerhaeuser Timber Co.	69,034	13,481	20	9,381	0.38
NORTHERN INTEGRATED COS.:					
Diamond Match Co.	30,682	3,482	11	1,812	0.60
Eastern Corp.	6,804	598	9	328	0.82
Glatfelter, P. H. Co.	6,267	1,124	18	491	1.33
Great Northern Paper Co.	16,226	2,040	13	1,156	1.04
Hammermill Paper Co.	11,814	1,201	10	754	0.68
KVP Co., The (Fiscal yr 9/30)–(2nd Qu.)	13,905	1,518	11	712	0.87
Oxford Paper Co.	15,733	2,098	13	960	1.09
Warren, S. D. Co.	15,978	2,082	13	994	0.91
INTEGRATED–NORTH AND SOUTH					
Crown Zellerbach Corp.	110,723	16,365	15	9,459	0.66
International Paper Co.	238,178	37,239	16	18,399	1.49
Kimberly-Clark Co. (Fiscal yr 4/30)–(3rd Qu.)	71,982	11,417	16	5,551	0.72
Marathon Corp. (Fiscal yr 10/31)–(1st Qu.)	35,859	2,969	8	1,357	0.38
Riegel Paper Co.	15,363	1,514	10	709	0.56
Scott Paper Co.	69,842	11,167	16	5,312	0.66
St. Regis Paper Co.	85,343	10,155	12	5,157	0.65
West Virginia Pulp & Paper Co. (Fiscal yr 10/31)–(1st Qu.)	46,806	5,770	12	2,920	0.56
SOUTHERN PAPER AND BOARD:					
Union Bag-Camp Paper Co.	39,266	10,007	25	4,752	0.67
PAPERBOARD–NORTH AND SOUTH					
Container Corp. of America	62,033	7,962	13	3,848	0.36
NONINTEGRATED PAPER COS.:					
American Writing Paper	n.a.	361	—	173	0.64
Sutherland Paper	16,121	2,165	13	1,038	0.97

n.a.–Not Available

The sales and earnings for the First Quarter of 1957 were especially prepared for PULP & PAPER by Cyrus J. Lawrence & Sons, members New York Stock Exchange, from statistical services and published reports. While the figures are believed to be correct, no guaranty is given as to their accuracy.

A Critical Year for Paperboard—

What it looks like for 1957 and beyond

What they talked about at the "resort of presidents":

Dr. Roos said "the big change is behind you—from now on it's brighter"

Kennedy's warning that paperboard industry must "raise its sights"

Bromley's warning about dangers in heavy cutting of softwoods

Ritchie's report of a brighter prospect for a balance in woodpulp

Newburg's figures on the outlook for capacity up through 1959

Westcott's forecast of another big year—and about some "Cinderellas"

Wakeman's plea for paperboard industry agreement on standards of products

Albert's hopes for future repeal of "obnoxious" transportation taxes

Thiem's report of more restrictive bills on chemical additive uses

Max's report of progress in campaign to remove paperboard odor

Whyte's analysis of mergers—how they increase, not lessen, competition

Beckwith's and Huysoon's advice that waste paper situation may worsen

● The paperboard industry must raise its sights, establish higher standards, develop new markets and products, said Jack R. Kennedy, head of Federal Paper Board Co., Bogota, N. J., in his first presidential report since his election as NPA chieftain last fall, before the National Paperboard Assn.'s May meeting in White Sulphur Springs, W. Va.

He noted that Standard & Poor groupings showed a 25.6% decline of its paper group and 22.4% decline of its paperboard group from their market highs in 1956 to lows in 1957, while the general industry decline was only 7%. Also, since 1957 lows, the recovery for paper was only 3.2% and a minus 1% for paperboard, while general recovery was 9.2%.

He urged a "two-pronged objective" to overcome this—improved public relations for the board industry, and market research.

Woodpulp—Brighter Outlook . . .

"The prospect of achieving a market balance in woodpulp supply appears much brighter now than it did a year ago," declared James L. Ritchie, executive secretary, U. S. Pulp Producers Assn., Inc., a guest speaker.

He reported that plans for some 5,000,000 additional tons of pulp have been deferred by North American producers. The rate of increase in capacity will decline sharply in 1958 and 1959.

"A favorable balance that existed in early 1956 will be restored by early 1960, provide the demand trends are back on their historic time table," said Mr. Ritchie. "Pulp industry management is asking these questions: What are demand prospects? Will extraordinary political and economic forces be less potent? Will spending for housing, foreign aid, etc., be reduced? What about substitutes for paper." Their outlook is one of "cautious restraint."

North American pulp capacity increase—"twice that justified by historic trends"—will be 117% next January, compared with January 1956.

Pulpwood—"Alarming" Events . . .

W. S. Bromley, executive secretary, American Pulpwood Assn., said the current cut in softwoods could be "alarming" if it continues for a long period and might exceed growth by 1975, but he was confident the many growing opportunities for use of hardwoods would more than equalize this trend.

The U.S. Service is more likely to be right in its "upper level" forecast of pulp and paper products demand in the U.S.A. by A.D. 1975 than had been generally believed in forestry circles when it made the forecast, in the fall of 1953, said Mr. Bromley. The "upper level" estimates by USFS had been considered unrealistic.

He noted expansion is also running ahead of the Stanford Research Institute forecasts. "These envisaged a 39% in total pulpwood use of hardwoods by 1975, a 49% increase east of the Rockies alone," he said, "In expanding our industry has increased use of softwoods at a 300% greater rate than Stanford researchers anticipated."

A truly "alarming" situation, said Mr. Bromley, is the current move to eliminate the exemption of crews of less than 12 men from the wage-hour law, which would affect pulpwood cutting crews. He said these small producers generally pay for piece work and have no idea of when the crews start or quit work. Anyway, most woods workers are earning the $1 minimum or more, and nothing would be gained by imposing these regulations. He said pulpwood producers made an impressive presentation against the measure before seven congressmen conducting a hearing in New Orleans.

5% Increase Each Year?

"We have seen the times when we were very pleased to have some standby capacity," Alvin Newburg, treasurer and statistician, told the NPA. "We must put pressure on for new uses."

He had some interesting figures on the outlook for paperboard capacity through 1959, under construction and under consideration. These figures follow closely capacity estimates which have been widely discussed for the entire industry.

He pointed out how "nebulous" capacities are. Actual production may vary greatly with similar capacities. Since last fall, he said, several companies have delayed previously planned expansion. "Others probably will do so," he said.

A 5% increase each year has proved a pretty good standard for the board industry since 1925, Mr. Newburg pointed out. The industry has been both over and under the 5% in recent years. "Some people say we will have a lesser growth than the 5% trend in the near future, but two eminent forecasters say 5% is not too bad. We must have sufficient capacity to take care of the peaks," he said.

Another Good Year In Making; Some "Cinderellas" of Board . . .

Warren Westcott, reporting on statistics prepared by himself and Mr. Newburg, noted that U.S. paperboard production in first 18 weeks of 1957 was averaging 273,900 tons per week —5.2% under the rate for the same period in 1956 ("which was the highest producing period in history"). At this rate, 1957 total production

would be 14,250,000 tons, the second highest production in history. The record, in 1956, was 14,366,000 tons.

The substantial growth in liners has been in Fourdrinier kraft, from 5,000 tons in 1925 to 4,051,000 tons last year, down by 2.1% for the first 18 weeks this year. Another "cinderella," semichemical corrugating material, dipped its production rate 1% during the first 18 weeks of 1957, the first break in a steady 9-year climb.

Special foodboards, in the boxboard field, have shown the largest growth of all grades during recent years, increasing from 400,000 tons in the 1940's to 1,245,600 tons in 1956. Present annual production rate is holding even with 1956.

Folding grade boxes were up 4.6% over the 1956 period and set-ups were down 8%.

Example of the effect increased capacity has on machine running time and production is shown by a comparison of operations during the first 18 weeks of last year and this year. This year there has been a 7% reduction in running time but production has shown a decline of only 5.2%. Man-hours per ton of production was only 8.3% in 1956 as compared with 11.6% in 1934, but labor cost was $18.24 per ton, three times as high as in 1934. These figures were for mills excluding kraftboard.

Standards—Agreement Soon? . . .

F. S. Wakeman, executive vice president, The New Haven Board & Carton Co., made a strong plea for some of the non-participating Southern paperboard mills to join in agreements on product standards. As chairman of the general standards committee, he said this industry has reached an importance in the eyes of the public where "it has a responsibility to manage its affairs in an orderly way, and a basic requisite are sound standards for products."

After making his plea, he hinted that chances were bright for wider agreement on standards in the next six months or a year.

Taxes and Freight Rates . . .

There is hope that Congress may eliminate the "obnoxious" transportation taxes in not too distant future—but not this session—John C. Albert, general traffic manager, West Virginia Pulp and Paper Co., and traffic chairman of NPA, reported.

APPA and Southern paper industry groups are protesting the move to jump freight rates by 22% in the east and west and 17% in the south (including recently granted 7% increase in east and 5% elsewhere). NPA is not participating in this protest.

Railroads have established charges

Around Institute Campus with P&P Camera . . .

ARNOLD "HYSE" HUYSOON (left), v.p., Continental Paper Co., and **JACK KENNEDY** (right), NPA president and pres. of Federal Paper Box Board Co.—"delightful neighbors-competitors".

HAROLD WRIGHT (left), v.p.-sales mgr., Gardner Div., Diamond Match; **ROGER DERBY** (middle), Champion Paper & Fibreboard sales, and **H. C. (PETE) PETERSON JR.**, (right), gen. sales mgr. Kraft div., St. Regis.

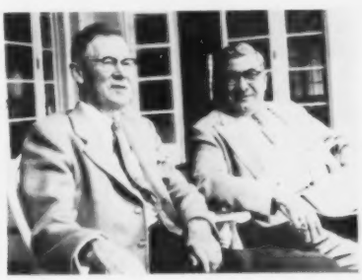
ALEXANDER "SOX" CALDER, JR. (left), president, Union Bag-Camp Paper Corp., and **W. C. SHORTER** (right), v.p.-sales, Camp Div., Union Bag-Camp.

J. D. DOOLEY (left), asst. Western sales mgr., International Paper, Kraft Div.; **F. H. SAVAGE** (middle), vice pres., International Paper, and **DAVE KENNEDY**, (right), I.P.'s Western sales mgr., kraft.

GUNNAR M. OLESON (left), International Paper sales, chats with **STURE G. OLSSON** (right), president, The Chesapeake Corp. of Virginia.

DAN INTHOUT SR. (left) v.p.-sales, Michigan Carton Co., and **W. H. (BILL) BECKWITH** (right), president, Morris Paper Mills, div. of Federal Paper Board Co.

ALLAN G. GOLDSMITH (left), The Mead Corp., given "sendoff" on retirement and **JAMES L. RITCHIE** (right), exec. secy., U.S. Pulp Producers.



J. A. AUCHTER (left), v.p., Kieckhefer Div., Weyerhaeuser Timber Co., and **MALCOLM K. WHYTE** (right) NPA counsel.

for return of metal racks, used for shipping appliances. The Fibre Box Assn. had protested their free return as discriminatory.

A new inflatable rubber pillow dunnage is proving highly efficient in supporting goods in freight cars. When ballooned it fills all open spaces in the car. Mr. Albert said it might be useful to paper companies, though its present high cost may restrict it to between-mill shipments. (PULP & PAPER learned later that the new type dunnage has been developed by U.S. Rubber Co.)

Other Serious Matters . . .

Care should be taken to insure accurate reports to the government, because of possible adverse effects erroneous ones may have on industry, said Don Becker, controller of Cornell Paperboard Products Co. for ten years.

Arnold B. Huyssoon, vice president, Continental Paper Co., and William H. Beckwith, president of Morris Paper Mills, Inc. of Federal Paper Board Co., reporting for the east and midwest, respectively, warned there may be serious waste paper problems this fall. Mr. Beckwith said inventories can help to level out drastic fluctuations and that contacts have been made with 300 dealers to put in balers and cleaning systems for cleaner waste.

In one of his reports, Merritt C. Thiem, secretary, noted that new and even more restrictive bills were introduced in Congress this year to amend the Food and Drug Act by requiring "burdensome and unnecessary" pretesting of food packaging in which chemical additives were used.

Another seminar on microbiological and biochemical problems in paperboard will be held late this year the South, sponsored by NPA's biological research committee, headed by Keith W. Max, manager of research and development, Robert Gair Div., Continental Can Co.

Progress is being made to inhibit or remove odor from paperboard. Dr. Max, graduate of DePauw and Institute of Paper Chemistry, said this has been traced to an organic sulfur compound in manufacture of unbleached kraft pulp. It can be removed by steam distillation. Dr. Max predicted further advance in this by chemical destruction of the odor or inhibition of the causative growth in the near future.

Are Mergers Lessening Competition in Industry? . . .

On the contrary, they may sharply increase competition, says Malcolm K. Whyte, of Milwaukee, NPA counsel, who has made an extensive study of the subject. If a board manufacturer merges with a converter, there may be less free board for sale, but it may increase competition by providing another well-organized integrated company.

(From left to right) **GEORGE E. MACKLIN,** exec. v.p., Green Bay Paper & Pulp, and **WES W. RACE,** v.p., Cornell Paperboard Products; **FRED GLOSE,** Eastern div., Fibreboard Paper Products, and **O. CORT MAJORS,** v.p. and sales mgr., also of Fibreboard; **JOHN B. NORTHUP,** v.p.-board sales, Owens-Illinois Glass Co., and **BERNIE ALTICK,** v.p.-marketing, Fibreboard Paper Products.

(From left to right) **JACK KENNEDY,** NPA pres. and pres., Federal Paper Board Co.; **MARK SANFORD,** v.p. and gen mgr., paper div., Fibreboard Paper Products, and **DANA NELSON,** Eastern mgr., Fibreboard; **MERRITT C. THIEM,** secy., NPA, **F. S. WAKEMAN,** exec. v.p., New Haven Board & Carton, and **ALVIN NEWBERG,** treas. and statistician, NPA.

The current trend of mergers is not nearly as important or extensive as it was in the 1920's, said Mr. Whyte. Mergers are relatively unimportant basis for growth, and always have been, he added.

There are 29 merger cases in the courts and six of the biggest are in the paper industry, making this industry "the guinea pig of merger litigation," he reported. The Federal Trade Commission has brought most of the cases, more than the Department of Justice. Seven cases have been disposed of; only two stopped mergers.

PULP & PAPER sources in Washington recently stated that 90-day merger notice law is a certainty to pass Congress. Mr. Whyte described the measure as giving the government "a clear privilege to get a temporary injunction against proposed mergers."

He noted that a "soft competition philosophy" which the government appears to be advocating may keep inefficient companies in business. He also observed that most companies are trying to diversify their lines to "even out their sales" but that the government view seems to be that if you diversify successfully you gain an unfair competitive advantage. The ten largest fibre box companies produced in 1956 only 42.2% of the business and the number of fibre box companies have increased by 50% since 1940 despite mergers.

Perhaps a most interesting portion of Mr. Whyte's talk before the NPA was when he pointed out inconsistencies of the government cases. In the Crown Zellerbach-St. Helens case, the government insisted on considering only local competition on the Pacific Coast, over Crown's protests, yet in the International Paper-Long Bell case, the U.S. position was just the opposite, embracing national competition.

The U.S. insisted on considering a very narrow field—coarse papers—in the Crown Z case. In the Owens-Illinois and the Continental Can cases, it takes a very broad line, insisting on considering the whole field of containers made of paper, tin, glass, etc.

What Dr. Roos Foresees for Board

A number of NPA delegates wryly conceded "business wasn't as good as it should be" but most of these were cheered up when Dr. Charles F. Roos, president of the Econometric Institute, Inc., New York, told them the "big change is behind you"—"you had it in the third and fourth quarters last year"—and from now on things will look brighter.

"Total paperboard demand for 1957 will be the highest in history,

DR. ROOS—
"It will be brighter"

slightly ahead of last year," he said. "For other industries it will be lower. The problem will be living with your new capacity till demand catches up."

The largest growth this year he foresaw in foodboards, and saw no reason ahead for this to level off. New packaging materials are competing strongly, but new markets for foodboards will offset such losses, he said.

While consuming buying power (disposable personal income plus the change in consumer credit less committed income) is 2½% higher, Dr. Roos pointed out that this is syphoned off by a living cost also up 2½%.

The past president of the Econometric Society stated there is little that can be done to arrest the general decline in production before next year —the decline was "decreed by the Federal Reserve Board ruling last summer (loan rate)"—but "most of what is still to come will be in the capital goods field—manufacture of machinery and equipment—and paper and board are somewhat insulated from that decline."

Paper and board are more affected, he said, by semi-durable and perishable consumer goods.

He put his finger on "the failure of demand to rise" as "the real cause of our temporary economic troubles," and with a chart he showed his listeners how cut-backs often start with the retailer or end-market seller. When this happens the supplier must cut back deeper, because he has been running ahead of the market to keep up with its growth. "But you are better off than the raw material supplier, whose cut-back must be still deeper," Dr. Roos told the board men.

Demand for paperboard for remaining quarters of this year will be higher than a year ago, he said.

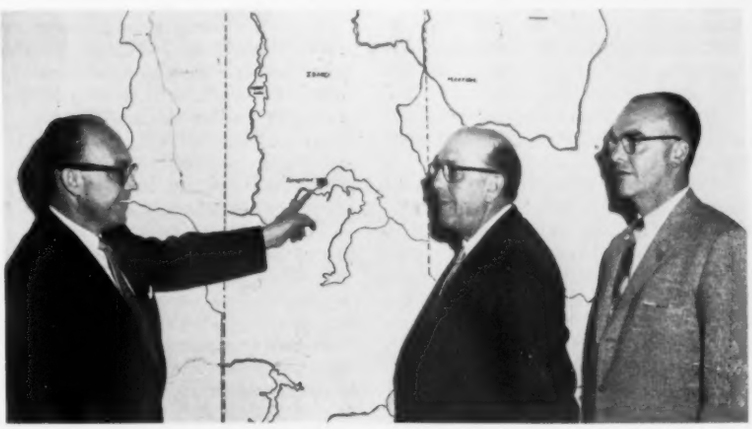
Says It's Up to Government To Advise Mill Planners

The "Kaniksu Country," a 4¾ million acre timber area of Northern Idaho needs wood utilizing industry and is doing something about it. Spark-plugged by the Chamber of Commerce at Sandpoint—a community best known to sportsmen because of adjacent Lake Pend Oreille, one of the west's largest natural freshwater impoundments—surveys of the region's industrial factors were released at a recent Sandpoint dinner attended by Pacific Coast leaders.

A guest speaker, Lawson P. Turcotte, president of Puget Sound Pulp & Timber Co. and Ketchikan Pulp Co., pointed out that although this region—80% of which is occupied with commercial timber according to the Kaniksu report—has the necessary wood, water, transportation facilities and power for a large pulp mill, the coast industry "isn't likely to look this far inland for at least two or three years." He counseled the group not to worry, saying "you need that time to develop your assets."

Mr. Turcotte said that a pulp mill built by firms other than those now having holdings would be largely dependent upon federal and state-owned timber plus sawmill wastes. The question then would be: "What will be the cost per M feet, cost per cord, or cost per unit of waste, over a long period?"

The answer, according to Mr. Turcotte, "would pretty nearly have to come from the Forest Service and state government, major owners of forests. I believe a thorough exploration of this problem would be necessary and at least some policy statement would be required to attract a pulp mill with its relative heavy investment."



Pulp Interest Mounts in Idaho
LAWSON F. TURCOTTE (center), pres., Puget Sound Pulp & Timber Co., evaluates pulp mill potentials for Sandpoint area which Chamber of Commerce Pres. DALE LEE points out on survey map. A. W. BLACKERBY (right), Supervisor of Nezperce National Forest, piloted project as Industrial Committee Chairman.

A Camera-Shy Camp . . .
JAMES L. CAMP JR., whom you don't often see in pictures, is seen here proudly receiving a plaque for notable contributions in development of Franklin, Va., site of what is now the Camp Division of Union Bag-Camp Paper Corp. Virginia Citizens Planning Assn. made the award. Mr. Camp is former president of Camp Mfg. Co. and is now vice chairman of the board of the merged Union-Bag-Camp organization. H. D. Camp is exec. v.p. and J. M. Camp, Jr., is asst. treasurer of the company.

Recognition of Service
KARL R. BENDETSEN (left), Champion Paper and Fibre Co. v.p. and mgr. of the firm's Texas div. mill at Pasadena, Tex., receives a Medal of Freedom award from Secy. of Defense CHARLES E. WILSON (right). Mr. Bendetsen, former under-secy. of the Army, was a representative of U. S. Dept. of Defense last year, conducting negotiations for mutual security arrangements in West Germany and the Philippines. He had been an attorney in Washington state, where he was raised.

Left to right: **GENERAL CLAY: "We have weathered a plateau." ERNST MAHLER: "We have only one competitor: our ignorance." JOHN STRANGE: "There's pressing need for basic research." DR. A. NEIL McLEOD: "Taxes are almost entirely at expense of profits" (see story under chart—his panel on who divides the productivity "pie").**

"Next Boom – '59 and '60" Gen. Clay

By ALBERT W. WILSON
Editor, PULP & PAPER

● Gen. Lucius D. Clay, former military governor of West Germany, who initiated the famed 1947 air-lift to Berlin, lost his glasses just before addressing 295 top executives of the paper and allied industries at the Institute of Paper Chemistry's Executives Conference in May. So his written speech stayed in his inside coat pocket. When he got through talking, someone remarked: "It would be a good thing if some other speakers lost their glasses, too."

Obviously a man of decision, the general made an all-out frontal attack on the pessimism which has recently reared its head in business circles.

There were 45 company presidents, a dozen board chairmen and 67 assorted v.p.'s in the Appleton, Wis., audience which heard Gen. Clay say:

"We have weathered the reaching of a plateau–1958 will be a normal business year, preparing for the next boom in 1959 and 1960. We owe this to the increasing sophistication of our business and financial leaders. I believe we are entering a period of relative world stability–as regards war, and economically, too.

"The paper industry is a little ahead of demand. But you can't build for the future without being ahead. No industry deserves to survive unless it is. Over-production is a necessary symptom of growth."

There was a spontaneous rising ovation for Gen. Clay, who is now chairman of the board of Continental Can Co., when he finished.

The former military commander of U.S. forces in Europe was aiming his shots squarely at the congenitally meteoric dispositions of businessmen, which seem to rise to greater heights or plunge to lower depths than any other class of people. The general was determined to raise any depressed spirits by the bootstraps.

Comments . . .

Afterward, some listeners were reluctant to accept his optimism. Others remarked: "He ought to know," "he had the facts to back up his beliefs," and "Continental Can is one of the biggest."

The general admitted he "is just learning about paper" since the "marriage" of Continental Can and Robert Gair Co., Inc.–"before that we were only in paper in a small way." But there was nothing small about the scope of his talk.

"The United States has the most invincible military machine in history," he said. "At the control are men who are determined not to use it. We have assured peace for many years to come."

But touching on the budget controversy in Washington, he said: "The people are interested in economy. The mail to Washington shows it."

He scoffed at reports that Russia is turning out thousands of technical students. "I have no fears on that score. Man must have liberal arts and freedom to think. There is no freedom of thought in Russia. The law of supply and demand is the law that has made our country great. This Institute is a great and a convincing answer to the Russian threat."

In making his optimistic analysis of the business future, he said "only a week ago I sat down and discussed these things with leading industrialists."

While predicting a record gross national product in 1957, up 5%, he conceded this is only an increase in prices and that housing was down–"but only a billion dollars." But inventories will be reduced to normal, he said–"this is the first year in American history that we are seeing inventory reduction at the height of a boom."

World Problems . . .

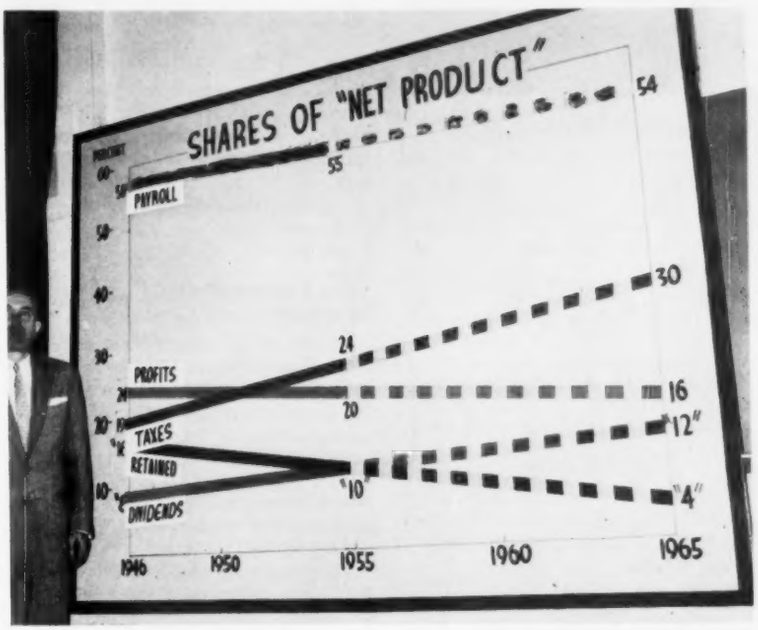
In 1947, year of his air lift, he said world problems were grave–it looked like France and Italy would put in Communist governments." Now–ten years later–he said "Europe is no longer a prize to be picked by Russia. . . . We know it can't depend on its satellites in war."

He went all-out in praising the policies of his former chief, President Eisenhower . . . "We saved South Korea . . . Viet-Nam has a strong leader

. . . India has lost its leadership in Asia to a better understanding of the West . . . a great part of the Moslem world is up in arms to resist Russia . . . a year ago a world war threatened . . . now the Suez is open . . Saud is supporting Jordan . . . the war threat, the immediate threat, is removed . . . never before have we achieved such results in the Middle East . . . the only weak spot is the Philippines, where there is no one in sight to take place of Magsaysay."

He closed with a warning: "Take a lesson from steel. Don't let overproduction lead to deterioration of the market."

He said "the young men of today have greater vision and determination" than when he was a West Point, 1918, graduate. "There is no limit to our horizons."



Who Benefits from Increased Productivity? Capital and Wage Earner Get the "Squeeze"

The above chart tells the story.

If any single event at the Institute of Paper Chemistry's Execs Conference challenged the Gen. Clay speech as the highlight of two-day program it was a student panel on this timely subject. For hours after the performance, industry officials were buzzing about it. They probably still are.

"We can't permit these trends to become a reality," warned Dr. A. Neil McLeod, Canadian-born Institute economist, graduate of Harvard Business School and Cornell, who guided the students. Neither he nor anyone else present, surely, believes they will—they hope the American people and their government have too much good sense to allow it. Anyway charts rarely don't run in straight lines, Dr. McLeod told P&P later.

The chart above deals exclusively with what is called the "net product."

This is what's left in a business after all costs other than wages are deducted. What remain to divide the "productivity pie" are human factors —wage-earners and their pay, owners and stockholders and their dividends and retained earnings, and the government (they are people) and their taxes.

This chart is based upon reports of 16 major pulp and paper companies making 26% of total U.S. output.

The top line—**PAYROLL** . . . wage earners' share of the "pie" declined from 56% to 55% from 1946 to 1955.

Projected in a likely unrealistic straight line this would slide to 54% in 1965.

PROFITS (dividends plus retained earnings) were squeezed from 24% to 20% in 1955. By 1956 this line would reach 16%—a decline of one-third in 20 years, however, would be too fantastic in a free nation, wouldn't it?

The squeeze is greater on **RETAINED EARNINGS.** Down from 16% to 10%. If that trend continued, it would be a ridiculous new low of 4% in 1965.

DIVIDENDS climbed a little, from 8% to 10%. By 1965, a straight line would take it to 12%.

But the big bite is in **TAXES.** Note this line starts at 19%, when taxes already were considered very high (1946), and has passed the 24% mark. It is soaring on its way to 30% by 1965, which would be double the profits.

Can any one believe that retained earnings—the life blood of industry growth and expansion—would be virtually wiped out in another decade?

The bigger and bigger bites that government is taking out of the productivity "pie" will have to come out of the wage earners in future years, if there is little left of profits.

These are awesome figures . . .

"Taxes are almost entirely at the expense of profits," said Dr. McLeod. "We must stop asking the government to do things for us that we can do for ourselves."

Young men in the panel: J. Graham Hyland, special student from Albert E. Reid Co., Ltd., England, who has made an interesting study on how depreciation allowed on paper machines bears no reality to prices of new machines today; Louis R. Busche, second year student from Milwaukee, and two third year students, David J. Kraske, from Rumford, Me., and Robert G. Guide, from Omaha, Neb.

The current squeeze of profits is regarded by many pulp and paper leaders as the most disturbing phenomena of our economy. "How will business grow, carry on necessary research, etc.?" they ask.

Dr. McLeod cited some "dangerous" ideas—such as, that wages can be pushed to the limits of productivity and that labor's production should be treated as "a special case." Non-productive workers in pulp and paper have increased 50% in the past decade. Productive jobs have increased only 6½%. Will industry have to weed out the non-productive jobs to get them back in proper proportion?

In order for employes to get more of this "pie" others, including government, would have to take cut-backs. A good bet is that employes will probably retain their share.

The chart raises questions whether one group is increasing its share of the "pie" at the expense of others, or at the expense of the industry's growth.

Not counted are stock options—that affects future profits.

One of the panelists quoted Peter Drucker, **"America's Next 20 Years":** He predicts the U.S.A. will have to scratch for investment funds.

Suggestion from the panel: Revamp tax laws dealing with depreciation of

profits. "The biggest impetus for growth and greater production comes from management, not from labor. Consumers share in the improved quality and greater array of products."

President Al Layton of CZ, closing this session, suggested research in how much of profits is affected by liquidation of assets, and particularly in the timber situation. Finally, he observed: "No sale, no pie."

What is Happening at IPC Of Importance to Industry

"The greatest talent hunt in history," is the way Institute President John Strange described the current intensive search of industry for more young scientists and engineers. In his annual report, he said the Institute is doing its part by enrolling the biggest class in its history next fall.

The Institute is trying to fill 14 staff positions. It added four recently and needs more staff. Scholarships will total $130,000 next year and will reach $185,000 within three years.

These five new company members have joined the Institute:

Crandon Paper Mills, Fort Madison, Ia.

Huss Ontonagon Pulp & Paper Co., Chicago.

National Gypsum Co., Buffalo, N.Y.

Southern Chemical Cotton Co., Chattanooga, Tenn.

Union Mills Paper Mfg. Co., New Hope, Pa.

Despite mergers, etc., there are now 126 member companies in the Institute. They make over 80% of U.S. paper and board. They pay membership dues totalling $670,000 a year. Owens-Illinois Glass, which acquired National Container, is not counted as a new member, though it sent top officials to Appleton for the first time.

Each member company is being visited to raise voluntary contributions of $750,000 for the building program (so far, $521,000 has been raised . . . the equivalent of one year's dues approximately are being contributed). There will be one new wing which will close the Institute quadrangle. Another $175,000 wing is being built now on the container building. It will house converting equipment, graphic arts and paper testing rooms.

Midwesterners Get Together

Left to right: CHARLES MOYER, vice president, Central Fibre Products Co.; LEO CROY, executive vice president, Marathon Corp., and RUSSELL C. FLOM, director of sales, Marathon Corp. Behind Mr. Moyer is NATHAN BERGSTROM, president of Bergstrom Paper Co.

New Faces at Institute

Left to right: ALVIN HUSS, Chicago lumberman who is president of Huss-Ontonagon Pulp & Paper Co., Ontonagon, Mich., new member of the Institute; H. L. FITZE, asst. secy. and treasurer, mill div. (formerly Natl. Container Corp.) of Owens-Illinois, of Tomahawk, Wis.; and K. M. CHERRY, formerly of Tomahawk, who moves to Jacksonville, Fla., to head Owens-Illinois' two Southern linerboard mills.

To date the Institute has graduated 192 with doctorates. These men are about evenly divided in production and research positions in the industry. There have been 56 special students from mills, for a year's study. The seventh new dormitory for students has been completed. Ten more are needed, said Mr. Strange.

"One Competitor . . . Ignorance"

Ernst Mahler, as chairman of the Institute trustees, characterized the contributions to the Institute, as measured by their return, as "ridiculously small." "The only thing we are suffering from are growing pains," he said. "The only competitor we have in this business is our own ignorance."

He reported at his alma mater, Darmstadt University's Paper Institute, after which the Appleton Institute was patterned, the dean had high praise for the American counterpart and its accomplishments.

Industry Served by Research . . .

Dr. Roy P. Whitney, dean of the Institute, in the opening address, described research as "a nearly ideal bridge between industry and education, providing a common ground where the two can meet, to the great advantage of both, provided each recognizes the strengths and weaknesses, the functions and obligations, of the other."

He then described the Institute as a partnership between education and industry.

"We dislike the adjective 'practical' as applied to research, since it implies that some research must be 'impractical'," he said. The distinction he made was that fundamental research is the "I wonder variety" and applied or industrial research is "the I wish variety."

"Industrial research often leads into a kind of 'oriented' fundamental research. Many companies also do, or sponsor, fundamental research because they know their applied research of more immediate commercial application will be valid and successful only as long as the development of basic understanding in the field of interest keeps pace."

Some Research Projects . . . Where They May Lead . . .

Facets of the research programs at IPC were then presented by a panel, to demonstrate, as Dean Whitney said, "to demonstrate the utility of fundamental research" and show research as "the use of intellectual capacity." Vice Pres. Harry Lewis of the IPC, introducing panelists, said "we are not so much concerned with results as beginnings."

Dr. Irwin A. Pearl, head of the IPC lignin group, who came from the U. of Washington and Seattle, told how fundamental research on aspen spent sulfite liquor mushroomed to an all-inclusive study of aspenwood. It was discovered that old tests applied to Lake States spruce gave misleading results when tried on aspen. An acid was discovered which apparently exists per se in the original wood. Information was gathered that would have been unobtainable otherwise.

Jerry B. Mugg, student from Texas A&M said research in the cambium of the tree, and cambial chemistry, may aid in development of better pulpwood. The cambium directly affects whether a tree grows big and healthy.

John W. Swanson, head of IPC physical chemistry group (changed from colloid to physical chemistry this spring), from Morningside College, Iowa, told how aging changes facial toweling surface—"the first layer of molecules on the surface must change." This may lead to better methods of removing raycells and resins from woodpulps intended for highly absorbent prducts.

Joseph D. Parker, student from North Carolina State College, reported "a chain of (IPC) theses, comparable to the sequence of operations

At Executives' Conference

Left to right: ALBERT W. WILSON, editor, PULP & PAPER; H. G. WINTGENS, executive vice president, Charmin Paper Products Div. of Procter & Gamble; NORMAN S. STONE, vice president and gen. mgr., Mosinee Paper Mills, and LEONARD S. SMITH, manager, Interlake Div., Consolidated Water Power & Paper Co.

on a Fourdrinier" and studies conducted with glass fibers led to "an equation that defines, approximately, the permeability of liquids in partially saturated fibrous media. It now appears more favorable to attack the problem of two-phase flow beds in pulp."

William Holtzman, student from Penn State, said basic studies in dispersion of clay may "affect what you are getting for your money when you buy clay." It is possible to determine where and to what extent adsorption takes place on clay particles. "Without this information a complete theory on mechanism of dispersing agent action cannot be formulated. It will be valuable in determining what is a good dispersing agent."

Dr. Johannes A. Van den Akker, head of the physics group, who hails from Cal Tech, told how the problem of fiber-fiber bond failure in paper and board has led to intellectual controversy. Some interpret changes in light reflected by the paper when subjected to pulling as attributable to fresh surfaces formed within the paper when bonds break. An IPC thesis indicates creep in paper is to be associated with creep within the fibers and that fiber-fiber bond breaking is not significant—until rupture of sheet is imminent. The IPC is perfecting new optical apparatus to measure these light modifications. Another approach may be to measure sound, if any, emitted when paper is pulled—by very sensitive equipment. IPC has done experiments on sound. "When true phenomena are learned, we can make progress," said Dr. Van den Akker.

Robert C. McKee, who heads the container section and formerly in the industry, said pioneering work being done on behavior of containers and boards is making progress. "When a sack of cement is dropped, strains differ at different points of the sack, and change with the number of times dropped." This can lead to useful information for making better containers.

William D. Major, a student from Colgate U., said of studies reveal partially acetylated cellulose. This may lead to more heat resistant cellulose—"by increasing resistance as much as 100% we may open way to many new uses—insulating papers, highly permanent papers, ultra high speed printing papers."

Scientists and Communication . . .

At this point, Dr. Ed Schoenberger, dean of students, came forth with one of his talks seasoned with well-mellowed humor—talks the conference would surely miss if they weren't on the annual program. His subject was communication, and while telling how the Kimberly library has grown from 4,000 to 19,000 volumes in three years, and abstracting for Library Notes mounted from 4,000 in 1956 to 5,800 in 1957, he had fun kidding about his subject.

"The scientist seems to be the only man with something to say and the only man who doesn't know how to say it," he said.

In a "look at cooperative research," Dr. Malcolm N. May, research associate, formerly with Champion in Texas, said IPC aims to supplement rather than duplicate company research. Group sponsored research has been increasing. The APPA, the Fourdrinier Kraft Institute, Sulfite Research League and allied industries are among sponsors. Government research, he said, is held to a minimum and is contracted for "only if important to national defense."

Grads Who Came Back

DR. DANIEL O. ADAMS (left), research director, West Virginia Pulp & Paper Co.'s central pulping, bleaching and papermaking research at Covington, West Va., and DR. KENNETH ARNOLD (right), technical director for all of St. Regis Paper Co. operations, who moved to New York City recently from Deferiet, N.Y.

New Mgr. in Newfoundland

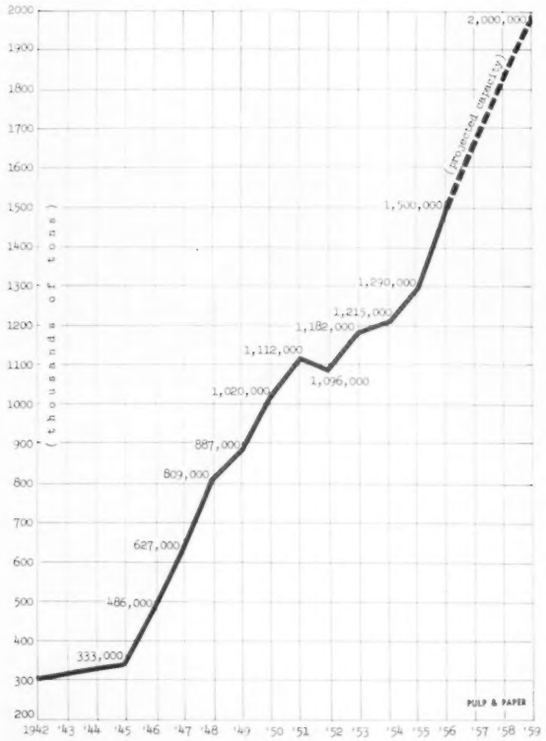
GEORGE HOBBS, who replaces GERRY PENNEY as mill mgr., Bowater's Newfoundland Pulp & Paper Mills Ltd., Corner Brook, Nfld. ROBERT HERDMAN takes over Mr. Hobbs' previous position as a resident engineer. H. B. CARTER becomes senior electrical engineer, J. O. BOUZANNE, former mechanical supt., is new plant engineer, K. ST. GEORGE is appointed supt. of plant protection services, and F. L. ROWSELL becomes heating and ventilating supt.

New Post for "Bumps" Hemphill

JAMES W. HEMPHILL, mgr. of pipe specialties for Johns-Manville Corp., retires June 30 on a company plan, to become sales manager of Carthage Machine Co., Carthage, N.Y. Mr. Hemphill previously was manager of pulp and paper industry for Johns-Manville, and has been prominent in industry association affairs for many years. He was one of the founders and the second chairman of the engineering division of TAPPI, serving in that capacity for several terms. He was born in Blairsville, Indiana county, Pa., in 1892 and received bachelor's and master's degrees in mechanical engineering at the University of Pittsburgh. Mr. and Mrs. Hemphill will move to Watertown, N.Y., from their Greenwich, Conn., home. Their son, "Rusty," is entering the Merchant Marine Academy in Long Island.

In '58—D. J. Murray's 75th

D. J. Murray Mfg. Co., Wausau, Wis., will be celebrating its 75th anniversary in 1958. Arnold Plier, president, and other officials of the company are busy making plans for their "big year."



The Pulse of Coating . . .
Printed papers production, past, present and 1959 . . .

Interesting Facts:

Total coated paper (printing papers) production: 1,221,700 tons.

For which the industry used: 959,945 tons of woodpulp.

Of which 268,963 was sulfite (246,259 bleached); kraft 308,044 (169,834 bleached softwood; 133,495 bleached hardwood), 256,526 tons groundwood and 35,494 tons of semichemical pulps.

Customers: Newspapers spent $5,095,000 for coated papers; periodicals, around $172,232,000 (703,236 tons—almost doubled since 1947's 417,891 tons).

Book publishing and printing industry bought $16,377,000 worth (60,214 tons vs. 19,162 tons in 1947).

Printing industry: $7,817,000 and 26,144 tons.

Production of Coated Paper in U. S. A.
(From Bureau of Census Report—1954, compiled by PULP & PAPER)

Region	*Tons*
North Central States	525,029
Northeast States	429,622
New England	221,025
Middle Atlantic	208,597
South and West	267,049

Coating Is Big—Is Getting Bigger

Trailing blade coaters are "hot"—over 20 units in use . . . mills in South add coating processes—more will follow

• That's what the man says. He's a composite of many of the top coating specialists PULP & PAPER talked to in Milwaukee during TAPPI's Eighth Coating Conference in May.

But the man also says this is only the beginning—like the top of an iceberg. You can add another 1.5 million tons of coated board to that above and you'll still be on the low side of one industry estimate that puts coated paper and board around 4 million tons.

And the trend continues. A soon-to-be released survey will reveal that coating capacity (printing papers) will rise about 25% by 1959.

First quarter production of paper machine coated printing and converting paper went up 8.4%, from 366,248 tons in 1956 to 396,982 tons. Coated, one-side, declined 18.8%, coated, two-sides rose 11.2% from 332,083 tons to 369,262 tons.

Actual coated board production is more elusive to arrive at. Producers of these grades (mostly folding boxboard and the up-and-coming special foodboards) do not specify their production in coated or uncoated terms. Folding boxboard, coated, is guestimated to be around one million tons.

More Than Doubled . . .

Since the last Bureau of Census report in 1947, coated printing papers have more than doubled (626,999 tons to 1,221,700 tons in 1954; 1,512,294 in 1956) and value of shipments went from $100,609,000 to $252,573,000 in 1954.

What's the reason for this tremendous growth and why is the trend still upward? It's tantamount to comparing a painted wall with an unpainted one, or better still take a look at a four-color printing job in *Life* magazine and compare it with a mimeographed house magazine. Get the point?

Printers all over the nation are getting the point—and according to a survey which Dr. Louis T. Stevenson, economist for Tucker, Anthony & Day, recently made for the Magazine Publishers Assn., coated papers for magazines (now around 940,000 tons) may rise to 2,180,000 tons by 1975.

Pulse is Good . . .

Surely one of the reasons why coating frontiers are extending further into realms of uncoated grades is the tremendous, dynamic energies of the men in this segment of the industry. TAPPI's Coating Conference has earned its reputation for being a top-notch eager-beaver about coating.

It is at these meetings each Spring that the pulse of the coating industry is taken and this year's verdict was: Never been in better shape. Here,

coating men compare notes—many heads are better than one on another man's problem. Here, too, the latest processes, techniques, coating tools are discussed.

Hottest topic in Milwaukee was the trailing blade coater which stirred considerable excitement at last year's meeting in Philadelphia. Said one technical director of a paper company: "There's so much we don't know about the trailing knife coater. We will be in the experimental stage for at least 10 years before we have evaluated it fully. Right now there are more than 20 units in operation, some pilot models. For instance, it might have terrific application for hot melt waxing, but we don't know as yet."

Coating experts were excited about the Crown-Zellerbach-Time St. Francisville, La., mill project, where a 258-in. machine will have tandem trailing blade coaters following a roll coater. (This principle of double-coating, applying one coat and then a second atop the first, is getting more consideration from coating men as it gives a better finish.) This will be the largest on-the-machine coating operation in the industry (largest, at present, is about 226-in.) and it was a much-discussed topic at Milwaukee, with experts taking conflicting views.

Consolidated Water Power & Paper Co.'s new on-the-machine coater also roused much interest among delegates. Reportedly balanced for 2,500 fpm, it will start up at 1,700 fpm, and will coat two sides.

International flavor of the meetings was added by visitors from England, West Germany, Scandinavia, Holland and Canada.

Southern mills are climbing aboard the coating wagon. An important Southeast mill is putting in a new coating operation. Another Southern mill expects delivery momentarily of a new experimental coater with an all-purpose coating head. Others are talking coating, too.

In Corridors, Progress Walks on Aching Feet . . .

Left to right: DEXTER WOLF, Kimberly-Clark Corp.; HAROLD M. ANNIS, Oxford Paper Co.; ROY W. HOEL, K-C; NATHAN MILLMAN, J. M. Huber Corp.; DICK MARTINEK, K-C and D. C. BEAULIER, K-C, take a breather after coating meeting to discuss industry trends. Pic by P&P.

Panel from Coating Mills Compare Their Methods

A comparison of coating methods was a meeting highlight. This was a panel session in which men closely connected with a particular coating process explained how it worked. (There were some "hedgings." One mill man held up a simplified drawing of his system, explained, "As you see this doesn't give away any of our secrets."

G. K. Dickerman, Consolidated Water Power & Paper Co., on the letterpress type Massey coater:

Some excerpts: Amazing versatility and dependability. Can be applied to wide range of applications: Wax emulsions and phenolic resins. In England a special coating containing carbon black is used.

Greatest versatility has been clay ranging from no minimum to around 62% solids—as high as coating can be pumped. Can be driven on paper machines drive. One has been built on a 185-in. machine. Speed ranges from 150 fpm to 1700 fpm on lightweight publication.

Rudy Griesheimer, research director, The Mead Corp., on the Kimberly-Clark-Mead process (a letterpress process):

Ranges up to 62 and 67% solids, and from 4 to 5 lbs. per side to 15 lbs. per side. No serious limitation as to pigment, additives; can use same on both sides of web. Has been used on paper machines 180-in. wide. No major limitation width-wise or in speed.

R. A. Vogt, technical director, Combined Locks Paper Co., on the Combined Locks Coater (this is a print roll coater-type):

It can be used at wet end press section, and dry end. Advantages: no separate draws. Rheology problems, as on some coating processes, don't apply.

William E. Welliver, New York and Penn., on gravure offset roll coater:

Uses rotogravure and offset printing methods. Equipment: A furnished roll, an engraved or knurled print roll, a doctor, a rubber-covered offset application roll and a back-up roll.

Advantages: For constant coat weight production with minimum adjustment, very satisfactory; assures uniform distribution of coating across web with continuous coating layer. Transfer of coating from cells to offset roll, then the shearing and spreading action of roll to web causes leveling out of coating on sheet.

Disadvantage: Lack of versatility to apply wide range of coat weights conveniently. Cost of many types of knurled rolls and cost of changing and

Participants in Coating Panel . . .

Standing, from left, are ART W. NEUBAUER, Crown-Zellerbach; RAY HALL, Allied Paper Mills; R. A. VOGT, Combined Locks Paper Co.; WILLIAM E. WELLIVER, New York and Penn; CHARLES RICHARDSON, Blandin Paper Co.; and PAUL THOMA, Time Inc.'s Springdale Lab.
Seated from left are G. K. DICKERMAN, Consolidated Water Power & Paper Co.; DR. FREDERICK FROST, S. D. Warren Co.; HARRIS O. WARE, Beveridge Paper Co.; GLEN T. RENEGAR, Container Corp. America and RUDY GRIESHEIMER, Mead Corp.

downtime involved is of major importance.

H. Ray Hall, chemist, Alllied Paper Mills, on the smoothing roll coater:

Operates similar to a size press. (They are going to add another coater.) Advantage: not as sensitive to viscosity as brush coater (level of viscosity is not as important), tends to reduce "fisheyes."

Disadvantage: roll patterns sometimes develop.

It is one of our most efficient means of producing high grade papers.

Charles A. Richardson, chief chemist, Blandin Paper Co. on the trailing blade coater (see PULP & PAPER's April, 1957 issue):

Can coat from tissue to board; some are operating on breadwrap. Originated at Fraser mills 10 years ago. Blandin began commercial operation April 1, 1956. Sheet is air-dried in dryer hood.

Operation at Blandin: range from 500 fpm (to make paster) to 1500 fpm (normal). Do not like to run less than 1250 fpm. Use eight Mt. Hope expander rolls. Metering and application and smoothing is simultaneous. Apply 8 to 9 lbs. per ream. When web breaks, you have a mess. Takes 15 to 20 mins. to clean up. A blade lasts about 10 sets of paper (about 8 hours), costs about 12¢ to 15¢ per ton of paper. Takes about ½ set of paper to hone in a new blade. Backing roll has Pusey & Jones plastometer of 70 (rubber rolls).

Trailing blade requires very clean coating color. Foreign materials cause cuts. Blandin has a magnetic separator ahead of each coater. Room temperature is adequate for coating color.

Trailing blade applys more coating on valleys than on hills (good). They put on about 4½ lbs. on wire side and about 3 lbs. on top side. Brightness and color of base sheet should determine brightness and color of finished sheet.

Dr. Fred Frost, vice president i/c research and director, S. D. Warren Co., on the air knife coater:

Air knife is superior to air brush (he saw latter in European mills—air jet spreads into a "V," does not give as clean an application). Limitations: Inability to handle coating at very high solids; as speed increases, you get more atomization; tends to coat hills and valleys with same thickness.

Plus side: Operation is simple. First day or hour you should be making good paper; inexpensive to purchase and operate; can operate at high speeds; uniformity of product is excellent; range is wide: 10 lbs. per M sq. ft. or 100 lbs. gives you great versatility on low viscosity coatings.

Defects are a minimum; high quality printing can be obtained; desired coating rate easy to establish and can be maintained; can be used for a wide variety of purposes: lacquer coat for asbestos, photographic paper for emulsion, sand paper. Main use is for printing and board—on the machine and off the machine. It is excellent to apply dyes such as photosynthesis.

Glen Renegar, mill manager, Container Corp. of America, on Champion (doctor) blade coater:

Experience has been on boxboard, using it on three board machines. Stainless steel roll turns in a pan against direction of sheet travel. Applicator roll is followed by wiping bar. This is a revolving rod (¾-in. dia.) driven at 16:1 ratio to applicator roll speed.

Drive both ends of wiping rods (twist on 150-in. machine would jump it out of channel). Have two stations on the board machine. First coater is stationary, about 25%-30% of way into dryer section. Second is 50% to 60% of way through dryers.

Prior to second station are rolls to smooth first station's coating. Unique in boxboard industry because they are only coaters located in dryer section applying coating to an uncalendered sheet.

Disadvantages: To get finish you have to calender the sheet as well as the coating.

Important: You can't expect to get a better sheet of clay coated board than your machine is capable of making. Very important is the operation of the machine and you are dependent upon the personnel on machine and in beater room. Papermakers have to learn all over again how to make paper to produce a satisfactory sheet.

System is capable of handling from 42% to 54% solids with average viscosity of 400. All types of adhesives, clays can be used.

Paul Thoma, consultant, Springdale Laboratories, Time, Inc., from the consumer's viewpoint:

Uniformity and ability to print colors at high speeds is very necessary. We are thinking of 30 lb. paper as the only answer to the problem of increasing postal rates.

Future Meetings

Theme for the 1958 Coating Conference, to be held May 14-16 at Bedford Springs, Pa., is "Coating Formulation." Emil R. Padavic will be program chairman, Chet Landes, American Cyanamid Co., is general chairman.

Future Coating Conferences:

1959—Boston
1960—Chicago
1961—Buffalo
1962—Cincinnati

St. Regis' Adams Sizes Up Prospects for Paper

Keynote speaker during TAPPI's Eighth Coating Conference, William R. Adams, newly elected president of St. Regis Paper Co., was reassuring about the business outlook:

"The present situation is not all bad. There has been no appreciable slowing in actual consumption of paper. Americans are pausing for reflection, a healthy sign and it will have constructive results.

"We are making a determined effort to maintain our activity and standard of living on less working capital, less inventory, more careful planning. . . . with smaller pulpwood inventory, three wires per machine in stock instead of six; a week's supply of clay instead of a month's. At home a six pack of beer instead of a dozen . . . two boxes of facial tissue instead of six.

"When 170 million people, each using 435 lbs. of paper a year all decide to work from smaller inventory, it can slow back buying considerably for a time.

"We have recently erred on the side of liberality. In labor negotiations we anticipated and rewarded for productivity increase which did not come; partly because we ran a little ahead of the clock; partly because levelling-off in customers' requirements did not permit us to eke out of our machines that last expensive ton or two of production.

"No other industry carries its process as far as we do—from the growing of the pine seed, through seedling to the goods the final customer uses. This puts upon us a trust never before entrusted to private enterprise. It requires us to provide our growing country with twice as much paper in 1975, at the same time insuring as many growing trees as we have today. It seems certain we can execute it."

"Present Situation . . . Not All Bad"

Said WILLIAM R. ADAMS, President, St. Regis Paper Co., keynote speaker at TAPPI's Eighth Coating Conference in Milwaukee, Wis.

BOX SCORE ON S. D. WARREN SUGGESTION SYSTEM

	1953	1954	1955	1956
Eligible Employes	2900	3050	3100	3250
No. Suggestions Received	554	532	553	595
No. Employes Submitting	340	329	290	377
% Participation	11.5	10.8	9.4	11.6
No. Suggestions Adopted	100	90	88	101
% Adoptions	18.0	16.75	15.9	17.0
No. Individuals Rec. Awards	88	80	86	97
Highest Award to Date	$599.00	$599.00	$1043.50	$1043.50
Highest Individual Total	$775.00	$775.00	$1260.00	$1260.00
Total Awards Paid	$4275.00	$3122.25	$6606.90	$5989.96
Average Award	$42.75	$35.00	$75.00	$59.30

Here's What Was Paid Out
This represents a lot of time, effort and money . . . Is it justified?

Here's Where It Pays Off
RUDY GREEP (middle), mill mgr., S. D. Warren's Cumberland mill, makes award to LOUIS RIOUX (left) and BILL WATSON (right) of pulp mill.

So, Here's a System That Works

But there are some rules you have to follow, Supts. National conventioneers are told, or it won't be a success . . .

That was the warning of Rudy Greep, mill manager, Cumberland Mills, when he told his story at the May 23 final session at the Superintendents big annual conclave in Chicago.

A respectable number of simple and novel ideas, mostly from employes about their own jobs have poured into the S. D. Warren Co.'s Maine management since its suggestion system was launched in Jan. 1950. Some $27,000 has been paid to employes. But what makes this system work?

- Cash awards of 25% of net saving for first year is paid; minimum award is $5; there is no maximum.
- Net savings are determined by deducting installation cost of suggestion from gross savings. If installation cost is large compared to initial saving, it may be spread over five-year period.
- If no tangible saving is evident, award is based on: 1—originality; 2—extent of application; 3—degree of helpfulness.
- Prime purpose of cash awards is to provide incentive to employes to suggest ideas for improvement.
- Mill manager makes presentation for more important awards.
- To be eligible suggestions must: 1—improve quality; 2—improve working conditions; 3—reduce costs; 4—increase production; 5—reduce waste; 6—save time or material.
- Patent protection—if employe desires it, S. D. Warren will help him get patent providing use will be assigned to company. Royalties from licensing others to patent use are distributed between company and patentee.

What Do Supts. Think of It?

One superintendent asked, "What do line supervisors think of it and what is its effect upon the usual 'let's get together and figure this out' technique?" Mr. Greep said foremen are quite enthusiastic about the program, they tell employes to put ideas into a suggestion and get paid for it. Foremen are overly fair, he remarked, and will do anything to see that the employe gets paid for his ideas.

S. D. Warren is happy with the system, believing that returns well justify the cost. But one mill man in the audience turned to his seatmate, said: "I'm still not convinced. Ten per cent acceptance means nine men mad and one man happy."

Mr. Greep's answer: "Occasionally, when a suggestion is rejected the author is not satisfied with the explanation, becomes disgruntled. In such cases, the system has a negative effect on morale temporarily. However, these instances are much in the minority and we believe the net effect on attitudes, morale and other human relation factors is definitely beneficial."

New Top Men
ALBERT E. BACHMANN (left), president and general manager, Mississquoi Corp., Sheldon Springs, Vt., is new president of American Pulp & Paper Mill Supts. Assn. During his administration, modernization of the association's constitution is expected. Next Annual meeting will be in 1958 in Boston.

JOHN D. DICKSON, JR., (right), Stowe-Woodward, Inc. (Kalamazoo), is new chairman of the Industrial Affiliate Committee, succeeding Milt Bixby, Hercules Powder Co., Inc.

Line-Up of V.P.'s
Bemis Wood, asst. to the v.p. for operations, Strathmore Paper Co., was elected fifth v.p. of the Supts. Assn., which puts him in line for president in 1962. Ahead of him, in order, are Howard Wehr, Mead Corp.; A. C. McCorry, St. Regis; Tom Coldeway, St. Joe Paper, and Ives Gehring, Oswego Falls Corp.

What's Good Plant Promotion?

H. F. TAYLOR, Jr., Scott Paper Co., told Supts. Convention in Chicago. . . .

If It's Important, Go First Class

Management backing, tangible objectives, getting everyone in act . . . these are "musts."

Formula: PP : ER = SP : S.

These hieroglyphics simply mean "Plant Promotion is to Employe Relations what Sales Promotion is to Sales."

H. F. Taylor, Jr., from Chester, Pa., gave this pitch to the Superintendents Association at its Chicago convention in mid-May. He showed how it paid off for Scott—and would pay off for other companies.

Both sales and plant promotion sell ideas and desires to transform them into some form of reality. Plant promotion can reduce waste, clean up your plant and can better your employes' attitudes. Most important, stressed Mr. Taylor, is that it gives people something to think about other than their jobs.

During World War II, these programs in Scott plants saved some $190,000 in fuel alone. In two years they reduced accidents from a 29.7 frequency rate to 2.6.

Ideas in action: One of the promotions produced a 50% increase in participation and a 50% payoff. For most effective results, however, the programs must have cooperation from the top down—they can't work by themselves, said Mr. Taylor.

One program promotion campaign to save waste ("Save the Best—Sell the Rest"), produced an $86,000 profit in six months, he reported.

Steps or keys to good plant promotion are:

- Management backing
- Tangible objectives
- Proper planning
- Good promotion—If it's an important thing to do, go first class.
- Get sales promotion, advertising dept., in on the act.
- Local operation—getting everyone on the immediate scene in the act to make people operate it themselves.

Problems of Paperboard Makers . . .

The manufacture of paperboard drew an overflowing crowd at its morning session, moved to larger quarters in the afternoon.

Robert F. Rubinson, production mgr., Ace Carton Corp., Chicago, led off with "Paperboard as Desired by a Converter," overcoming a couple of handicaps in doing so. Not only was he pinch-hitting for Ed Berg who was slated to give the talk, but his wife was in the hospital having a baby (it's a boy).

Mr. Rubinson said odor is one of their biggest problems. The only test they have for detecting it is to chop up samples of the board and heat it in distilled water for 30 in., then let stand for 24 hrs. If the board has any bad odor after this, it is rejected. He said they would be happy to hear of any better methods of testing for odor.

Arthur C. Dreshfield, Chicago Testing Laboratory, speaking on "Sizing Paperboard for End Uses," said it is entirely feasible for a mill, in experimenting to determine how big a reduction in amount of size could be made, to make a rather drastic cut of 50% on the first trial run. In testing the result, he said many mills could detect no differences at all. He emphasized that whatever the reduction in amount of sizing, it must be remembered that some other material, perhaps more expensive, will have to replace it.

Charles L. Peckham, Wabash div., Container Corp. of America, closed the morning session with a talk on "Operating Difficulties of Cylinder Machines." He said they are constantly striving to decrease the biggest cause for lost time at their mill—stock changes. Speaking of the problem of deep-colored felt hairs in light or white grades of boxboard, he remarked that a colorless felt-treatment which keeps felt from stretching, resists bacteria, and does some of the other things that present treatments do, would be a sure thing at the Wabash mill.

How About Sizing? . . .

One mill man was critical of a testing machine for printing which uses oil as a vehicle. "You should use as a test vehicle the vehicle that is in your ink," he said. "With this unit you have to test with oil and you are not printing with oil. I suggest technical directors try this out."

Some comments: You have to treat your surface if you want better printability. That is the way to impart nicety of printing—surface sizing. Reason for "blotching" is the type of material you're putting on surface plus formation (affected by mixing broke with stock, etc.). This controls what you get on surface.

A supplier said internal sizing doesn't give resistance on the surface.

A printer was quoted as saying he'd like to get his paper in such a condition that he could take the skid off the truck, run it at a predetermined rate and consumption.

Monograph on Digester Linings

Review of recent technical developments by EDWARD F. TUCKER, president of Stebbins Engineering & Mfg. Co., at Supts. Convention, was rated as "monograph type" roundup of subject.

"Brainstormers" in Action
This picture, reprinted from PULP & PAPER's cover, illustrates a technique the Supts. tried out at Chicago. Here are execs of Crocker, Burbank & Co. Assn. (l to r): BIGELOW CROCKER, JR., DON CROCKER, PAUL DINEEN and ED FERRELL. They are brainstorming their way out of a production problem.

But How Effective Is This Technique?

A new fad of business and industry . . . as old as the hills in conception . . . has to work fast . . . judgment comes later

Just three months after the above cover picture appeared on PULP & PAPER, the National Superintendents Convention in Chicago gave it a try with a hand-picked squad of "brainstormers" from five mills and a supply company.

They got their answer.

Edmund N. Greene, Monsanto Chemical Co., St. Louis, instigated the Chicago stunt. It was a climax to his talk on "How We Do It."

His "working model," drawn from Chicago delegates, came up with 46 ideas in just 15 minutes, all on very short notice.

The brainstormers were Albert E. Bachmann, pres. of Missisquoi Corp. (and new president of the Supts. Assn.), Clarence F. Kingston, supt. of paper mill, Hammermill Paper Co., Donald Goodman, gen. supt. of papermaking, Sorg Paper Co., S. F. M. MacLaren, Penick & Ford., Ltd., Vincent Redman, Kalamazoo Paper Co., and Lester H. LaLiberte, KVP Co.

Their problem was "How to train supervisory mill personnel," and among the ideas fired in rapid succession were:

"Have him follow an order through, from the time it arrives till the finished product is delivered;"

"If he's in production, have him draw up flow diagrams—in the process he'll learn a lot about the business."

"Have him conduct plant tours."

One suggestion, "Put a man in as assistant in the job he is to get eventually," was quickly qualified with the warning to be sure to have some place higher up for the man he is assisting to go.

Mr. Greene said that Monsanto has had great success with the brainstorming technique, adopted from suggestions made by Alex Osborn and his colleagues at Batten, Barton, Durstine & Osborn advertising agency. The three cardinal principles are: First, a group is more productive than an individual in producing ideas. Second, it is essential to separate judgment from creation—brainstorming establishes a free flow of ideas, good, bad or indifferent, and judgment is brought into play only after the session is over, when it won't slow down the creative process. Third, remember, the more ideas, the better. How much better off is the mill superintendent with 40 good ideas to choose from than the man who has only one or two.

As examples of the number of ideas which can come out of brainstorming sessions, Mr. Greene gave the following instances: "How to eliminate long lines in the company cafeteria"—number of ideas, 33. "How to keep three small children happy on an automobile trip from New York to Cape Cod"—number of ideas, 41. And finally, "How young women can meet eligible young bachelors in New York"—number of ideas, 106.

Communication—Powerful Tool . . .

D. C. "Dellie" Cotton, assistant woodlands manager for Union Bag-Camp Paper Corp., at Franklin, Va., emphasized radio communication as a powerful and effective tool at an industrial engineering session of the supts. meeting.

He told of a bachelor friend about to enplane at an airport, who took out five different insurance policies, made each out to a "Miss" beneficiary in a different city. Reason: "I make my itinerary up ahead of time, these policies reach each girl before I do. They think I am continually thinking of them, give me a much warmer reception. This type of communication really pays off."

Previous to installing two-way FM radio communications at Franklin, Union-Camp had difficulty keeping tabs on its pulpwood barge. Mr. Cotton related some anxious moments when the barge was overdue on one trip and all hands had to tumble out to search for the sandbar-stuck barge. "Had there been radio communications," he recalled, "We could have been in bed, no worry would have been present in anyone's mind and no miles would have been driven at company expense."

Union-Camp now has a two-way FM radio communication system. Main station has a 250 watts output, mobile units, 60 watts. They are licensed with FCC for 25 mobile units, 5 handie talkies and 4 land or fixed stations.

Initial cost was $13,600 including installation. An FCC licensed technician takes care of monthly maintenance requirements for about $135 per month. This includes all labor, parts, etc., and has been satisfactory.

Q.'s and A.'s on Felts . . .

The p. m. session studied synthetic fibers in machine felts; felt hairs; sizing; "over-specifications" by customers. (MM is mill man; S—supplier).

Q. How about operating difficulties with synthetic fibers in felts?

A (MM). I don't think we have had enough experience to say what is right or wrong. We had some trouble, took the synthetic blend felts off and the trouble was corrected. We checked with other mills and their experience was the same. Felt life does increase with synthetics—about 25%. Latter part of run felt gets raggy. We are going to put one on and get some data on it.

Q. Do you schedule your machines to felt life or machine grades?

A (MM). We do it by various grades. We expect the felts to perform and make satisfactory board un-

til they are changed.

A (MM). We do it according to felt life.

Q. What is the advantage of synthetic felts?

A (S)—Only advantage is longer felt life. Disadvantage is that a synthetic blend with wool makes a harder, more quickly compressed yarn, hastens inability to absorb water. Some mills schedule coarser grades towards the end of felt life. Felt mark is a factor in moisture in sheet.

A (S). With new and varied synthetics other advantages will be gained.

A (MM). "You can't find one superintendent out of five who will agree on the use of synthetics. It won't give you better finish."

Q (MM). Is there an optimum point—what properties do they add—where do you stop?

A (S). We're working for 25%. When you go higher you no longer have the same fabric. Many advantages to be found in wool are not in synthetics. We're working with nylon and Dacron. You can build a better stable product with Dacron.

Q. What have been your experiences with felt hairs?

A (MM). Our experience has been a bad complaint every five years.

A (MM). Oftener than that. We had felt hair epidemic a few years back, some were human hairs and our machine tender is bald. Order was remade in another mill and we had the same trouble. Finally we ran it through a hot wax unit (dry) and burned it off. Sent the fiber to the Institute of Paper Chemistry and they analyzed it as wool.

Other comments on felt hairs: Majority of felt hair is on bottom of sheet. One mill uses a flame all the time. Extra benefit is to burn dust and dirt off. One mill tried this but didn't eliminate it completely and it was a fire hazard.

"Don't Like Specifications" . . .

Comments: Sometimes a customer asks for specs to be built into a sheet which the customer doesn't need. More and more board specs are creeping into the folding carton industry because "salesmen are using specs for a selling tool. Salesmen says our sheet has so and so."

Disagreement from a mill man: "I don't think we can take any customer's specs and say he doesn't need that. It requires a thorough inventory to determine what the customer wants. Accept it as face value until we learn otherwise."

An example: A large soap company used to have machines for filling its giant soap boxes at rate of one a second. Now the rate is 300 a minute, five every second. Rejection rate used to be set at 3% and then "you were doing good." Then the company lowered rate to 1% (that's 1 out of every 100).

Finally, the soap company said this wasn't good enough. That rate meant three rejects every eight minutes (takes 15 mins. to unjam machine), would hold up production 45 min. "The speed of production has done this and so, too, has the incentive system," said a mill man.

Slow Fans, Enclose Dryer Section . . .

. . . to obtain production economies from existing machines. Gearhart hears of 50% annual return on investment

The same enclosed system incorporated when installing a new machine can achieve similar savings without adding to the caiptal investment. . . .

Norman Fawkes, project engineer of Sandwell & Co., Ltd., Vancouver, B.C., advanced these possibilities in discussing the theory and economics of the elimination and recovery of waste heat from cylinder dryers at the joint TAPPI-Superintendents June 6-8 meeting at Gearhart, Ore.

Presuming a dryer producing 200 tons a day at 90% bone dry, where the product enters the dryer at 30% bone dry, the dryer evaporates two tons of water per ton of product. In doing this, approximately 25 tons of air passes through the machine hood per ton of water evaporated. Therefore, he says, the 200-ton dryer would evaporate 400 tons of moisture per day and pass 10,000 tons of air.

Air going through this mill system experiences an 80° F. rise, picking up heat at a rate of 0.24 btu per pound of air per degree rise or around 40,000 btu per ton of air. At 1,000 btu per pound of steam, steam consumption will be 40 lbs. per ton of air or 400,000 lbs. of steam daily at a cost of $200 valuing steam at 50¢ per 1,000 lbs.

Mr. Fawkes states, "When you realize that the heat represented by this value does not contribute in any way to the evaporation of moisture from the product, and is, as far as the drying is concerned, wasted, then it does assume some significance."

Participants at Gearhart

Left to right: DR. BEN BRIGGS, Olympic Div. research director, Rayonier, as TAPPI section chief, was co-chairman of convention; ROBERT SMYTHE, of Ray Smythe Co., Portland, Ore., was a busy man as secy.-treas. of Coast TAPPI, a job he holds another year as result of re-election; DANIEL E. BEASLEY, tech. asst. to paper mill supt., West Linn mill, told how heating panels speeds up production of offset coated paper.

How To Do It . . .

To eliminate or reduce this waste heat he recommends enclosing the dryer and decreasing fan speed. First he calls for enclosing the dryer pit, the installation to have generous access for servicing the machine and cleaning the pit. This modification "does a great deal to reduce convection currents but does not offset the effects of radiation from the dryer. It would allow us to effect some small reduction in air flow."

Next he suggests enclosing the dryer between the operating floor and open-hood curtains "as tightly as is consistent with the required access for operation and servicing and the usual quality of fabrication from materials ordinarily used for hooding dryers."

The significant result would be "that we could reduce by one-half the total air flow through the dryer." Mr. Fawkes points out that this does not mean reducing waste heat by half as the dryer has the characteristic that the rise in temperature of the air

varies inversely as a function of the rate of air flowing through it. Besides, the amount or temperature of air used for drying felts or absorbing vapor has not been changed. As result of simply enclosing the dryer and halving the air-flow through it the air enters the system at a lower temperature and leaves at a higher temperature than takes place in a non-enclosed, hooded dryer.

Save $20,000 Per Year . . .

Mr. Fawkes calculates the value of steam thusly required at approximately $140 per day—a saving of $60 per day, or $20,000 per year by enclosing the dryer. Besides, he says, there would be additional small savings from reduced fan horsepower in addition to such benefits as improved room comfort conditions, and possible improved quality and increased production due to more even drying across the sheet.

The capital investment required to properly enclose an existing hood for an average 200 ton machine "would be about $40,000 and the gross (annual) return on the basis of the calculated savings would be at least 50%," he said.

In a final comparison of open versus closed system economics, Mr. Fawkes pointed out that for any given new installation on a new machine "the capital cost of the most economic closed system will be equal to or less than the capital cost of the most economic open system. That is, if a 200 ton dryer were being installed in a new mill, we may save wasted heat to the value of $25,000 per annum with no additional capital investment by simply enclosing the dryer at the outset. The increased cost of the hood is offset by the decreased cost of air handling equipment."

In Mr. Fawkes' opinion cylinder dryer enclosures currently being installed are "fairly crude . . . and much room for refinement and simplification still exists".

Gearhart Session Emphasizes Cost Savings

The Gearhart joint session emphasized the industry's need for trimming costs and wastes and improve production efficiencies. Jack V. Savage, chairman of Pacific Coast Superintendents and sulfite supt. at CZ Camas mill, pointed up the meeting's thesis in his opening statement. He said, "We could well be on the threshold of a demand for more individual responsibility to counter the accumulating effects of many years of easy-going economy." Pacific TAPPI, headed by chairman Dr. Ben T. Briggs, Olympic research director, Rayonier Inc., Shelton, developed participation along technical aspects contributing to the "cost and waste reduction" theme.

How Scott Recovers Fiber . . .

Scott Paper Co.'s installation for reclaiming fiber from knotter and flatscreen rejects at the firm's Everett, Wash., plant was discussed by Norman S. Lea, technical control manager. This fiber recovery system consists of a Rietz hammer-type disintegrator processing knotter rejects which are subsequently mixed with unbleached flatscreen rejects when dewatered and tank stored.

Next the oversize reject material is removed by Trimby screens enroute to two 12-in. Bauer Centri-Cleaners from which accepted stock flows over a line of vibrating screens—a process found effective for removing shivey material. The recovered fiber is mixed with unbleached pulp and routed to the unbleached screen room. After screening, the mixture goes through the bleach plant, passes over rifflers, flatscreens and through four stages of Centri-cleaning before deckering and pumping to paper mill or pulp dryers.

Mr. Lea reports this installation has reduced fiber loss in pulp mill sewer effluent "to a very low value . . . well below the limits set forth by the state." Besides, much of the former low-value and waste materials are now converted into high-grade fully bleached pulp. He says the installation proved out financially attractive "since it means savings in wood, steam and chemicals over our normal pulping costs."

Heat Panels Speed Up Coated Paper Output . . .

Daniel E. Beasley, technical assistant to paper mill supt., Crown Z, West Linn, told how that mill gradually increased speed in production of coated offset paper over the past two years. Although this product was first run at a speed of 40% below that of comparable letterpress weight, improving the flow properties through higher shear circulation by increasing coating solids brought the rate up to within 13% of the rate for letterpress. By a series of developments with far-infrared, the production rate for offset paper has increased to equal that of letterpress.

Far-infrared heating panels were variously installed between the coating applicator and baby dryer roll to accelerate drying the protein-clay coating. The solution was to use two such units, as now operating on No. 6 machine, one installed above the sheet and the other below it.

In addition to increasing the drying rate, the use of these electric heaters minimizes dust from the coating. Power charges for this application, according to Mr. Beasley, "run less than a nickel per ton of paper produced."

Time to Tighten Belts

JACK SAVAGE (left), chairman of Coast Supts. Division, isn't reaching for a belt, but he did tell Gearhart conclave to think about cutting costs and wastes; GLEN KING (middle), asst. mgr., West Linn mill, urged technical papers should be more concise—more to the point; PAUL BILLINGTON (right), Weyerhaeuser Research, Longview, was elected new vice chairman of Coast TAPPI (new chairman is Norman Lea of Scott).

Don't Write "Goobledygook"

Technical report writing was considered from various aspects by a TAPPI round-table participation. Moderator P. T. Dickie, technical director, Crown Z, West Linn, told the group this presents a real problem to modern industry. Of the millions spent on research and other technical work in the mill laboratories, much of it can be wasted unless the resultant reports are "clearly written in a manner that operating and management people can take proper action." Mr. Dickie feels that good technical reports "can go a long way toward improving quality and trimming costs."

Panel Member Glen D. King, assistant resident manager, CZ West Linn, presented management's view. He pointed out that a technical report must, above all, be accurate. It should be concise, the summary brief and to the point. He suggested that the report should in effect be a brochure endeavoring "to sell ideas to management and executives."

New Coast TAPPI Officers

Pacific Section TAPPI election results at Gearhart meeting:

Chairman, Norman S. Lea, West Coast Div. Scott Paper Co., Everett, Wash.; vice chairman, Paul Billington, Weyerhaeuser Timber Co., Pulp Div. Research, Longview, Wash.; secy.-treas., Robert Smythe, Ray Smythe Co., Portland, Ore.; other executive committee members—Carter Watson, Puget Sound Pulp & Timber Co., Bellingham, Wash., Arthur W. Neubauer, Crown Zellerbach Corp., Camas, Wash., and Douglas Armstrong, R. T. Vanderbilt Co., Portland.

Looking Down from Air on New Mill at Cosmopolis

1. Administration Bldg.
2. Water Filtration Plant and Basins
3. Laboratory
4. Warehouses
5. Machine Room
6. Maintenance and Store Room
7. Pulping Group, Digesters, Bleach Plant
8. Chip Storage Silos
9. Wood Preparation Plant
10. River Storage
11. Woodyard Log Storage
12. Power-Recovery Group
13. Truck Shop

Unusual Mill Has Many "Firsts"

Cosmopolis uses rare process, but materials and methods employed may be useful in more standard type mills, too

By WARD C. WILLIAMS
District Editor, PULP & PAPER

• The phrase "Grays Harbor Pulp Division—Cosmopolis, Wash." now takes its place in the world's pulp picture. It will be heard a lot in years to come. Two years ago Cosmopolis was a tiny (pop. 1245) sawmill town that was but a shadow of its one-time heyday as an important lumber producer. Now it's the site of the largest single project ever undertaken by Weyerhaeuser Timber Co.

The new Weyerhaeuser mill started up March 13. It was built to produce 400 tons per day of high quality bleached sulfite market pulp, employing the magnesia (MgO) base cooking process which permits recovery of about 85% of cooking chemicals.

As a recent newcomer to the Grays Harbor area as an operator (WTCo has owned and managed forest land in Grays Harbor county since 1900, including the nation's first certified tree farm), Weyerhaeuser is opening a new chapter in its history. New offices at Cosmopolis housing the Grays Harbor Pulp Division and the Clemons Operation (the logging and forestry enterprise which supplies the pulp mill and two WTCo sawmills)

NEXT MONTH—See PULP & PAPER's Special Story on Wood Production and Preparation for Cosmopolis Pulp Mill . . .

are headquarters for over 800 employes.

Says young (37) resident manager Joseph C. Brown:

"The mill will be a very efficient one, easy to operate—and easy on the eyes, as well. We have had no serious problems. Before the end of the first month we were up to 60% of capacity. Our quality will be comparable to other Weyerhaeuser sulfite market pulp. Primarily it is paper pulp which will go into a wide variety of products, such as bond and offset and other fine paper grades.

"The site was laid out and plant designed so it could be increased in capacity at a minimum of expense."

The Grays Harbor Pulp Division "firsts": (1) First Weyerhaeuser project of such magnitude to be built new. (2) First entirely new sulfite mill in the U.S.A., excluding Alaska, since 1936, though others have added major sulfite units in Wisconsin and Washington, (3) First sulfite mill in Washington to be granted a "permanent" five year permit by the state pollution commission prior to building, and (4) First completely new mill to employ MgO in continental U.S.A.

Original planning and overall supervision of the Grays Harbor project was in the hands of Vice Pres. Howard W. Morgan, Pulp Division Manager, who worked closely with Ray E. Baker, manager of manufacturing.

Explained Mr. Morgan: "We used the sulfite process because the timber on our three adjacent farms in that area is predominantly western hemlock, a species primarily suited for the process. Further, there has not been the expansion in high-grade sulfite pulp necessary to keep up with demands. It has advantages for many types of paper."

Unusual Features of Fast Construction Job

General layout of the mill was well underway prior to the death of Gerald Alcorn, Weyerhaeuser's head mill construction engineer. His staff had absorbed an extraordinary degree of competence due to WTCo's accelerated building program in the previous five years. Mr. Alcorn's successor, his assistant, Merrill Robison, was only 30 years old when assigned the Cosmopolis job.

Mr. Robison told PULP & PAPER, "To our assistant engineers goes a large degree of the credit. Harold Semple, Bub Goodness, Donald Wooden and Pete Landry, working with our other young engineers, completed 1200 drawings in 17 months."

Hoffman Construction Co., Portland, Ore., was general contractor for the project, with Jack Beaver as construction manager. The power and recovery group was contracted to C. C. Moore & Co., Engineers, of San Francisco and Seattle. Dave Harris, Seattle Manager was in general charge. Lindsey Boudreau was resident project manager, Larry Vais, project engineer and Hans Leschke, electrical engineer. Design in the evaporator area was by Chicago Bridge & Iron Co., and Weyerhaeuser engineers. Acid plant design was by A. H. Lundberg and Vic Palmrose, consultants.

Site preparation on the 850-acre tract was scientifically done by consulting site and soil specialists Dames & Moore. It is expected that the site will settle two feet in 20 years. To allow for this, builders used every possible precaution in laying the underground piping.

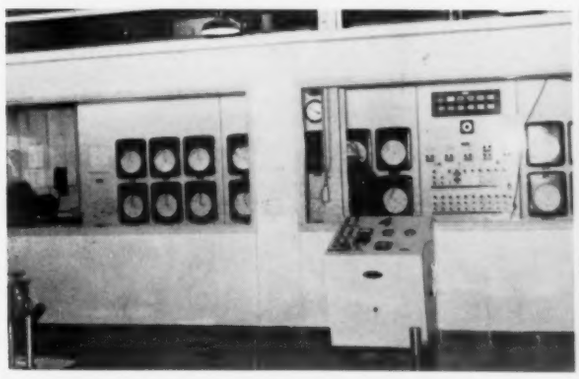
Procedure calls for monthly inspection of all underground pipes. This is made possible by means of a vertical 2-ft. steel pipe welded to larger horizontal pipes beneath ground level. These pipes were cut off flush with the ground, so future settling will be easily determinable.

Fill work on the site and dredging of ship berths and turning basin was by Puget Sound Bridge & Dredging Co.

Steel and concrete piling up to 155 ft. in length furnished a solid foundation. These piles can each support 60 tons plus 150 tons of down-drag due to compressible underlying soils. They were driven down to firm gravel. The 3500 piles on this job are believed the largest single job that Raymond Concrete Pile Co. has done on the West Coast. One third of the piles are pipe-step-taper, while the remainder are step-taper. The pipe-step-taper piles consist of 10-in. pipe at the lower end with corrugated shell tops filled with 5000 lbs. of concrete. The step-taper piles are all corrugated shell

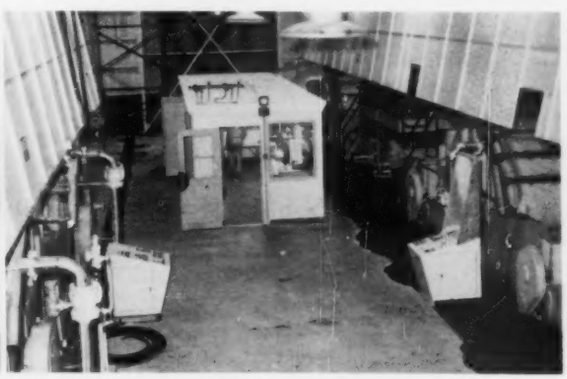
WTCo President

FRED K. WEYERHAEUSER, of St. Paul, is President of Weyerhaeuser Timber Co.



Many Controls in Digester Room

In this central location are recorders and controls for conveyors and tripper feeding digesters, steam flow, liquor temperature, pressure; accumulator temperature, pressure and level; plus push buttons for conveyors and transfer pumps. Panellit layed out and installed instruments.



Bleach Controls in Free-Standing Room

Bleach plant control room by Armco Drainage & Metal Products is a separate structure on operating floor, with excellent view of washers.

filled with concrete. Some 29,000 cu. yds. of concrete and 3700 tons of structural steel were consumed in the mill construction.

The time lapse from date of original survey to machine start-up was 21 months minus two days. (Actual construction was 17 months). This beats the two-year period required for construction of the Everett kraft mill of Weyerhaeuser.

A handsome combination of colors and materials has been obtained by sheathing buildings with grayish corrugated cement asbestos and using greenish translucent plastic windows by Filon Plastics Corp.

Nitrose paint was applied to all outside structural steel and some of the steel tanks. This anti-corrosive protection can be put on without any previous surface preparation. In the case of lined tanks, Erkote insulating mastic was applied to all brick- or steel-lined outside tanks.

All Rest Revolves Around "Pulping Group"

At Cosmopolis, where there was plenty of ground space for ideal location of the various component buildings, the Pulping Group is the central structure. Located radially from it are the office and lab, filter plant, power and recovery group, chip silos, maintenance shop and machine room. Completely covered and inside are the seven Chicago Bridge & Iron digesters, each 17 ft. in diameter, 60 ft. 3 in. high, capacity of 9,000 cu. ft. All digester and accumulator linings are Stebbins acid-resistant brick. Special Stebbins membrane type brick is used in digesters. The four acid accumulators, also by Chicago Bridge, measure 17 ft. dia. 60 ft. high; capacity 12,070 cu. ft. each.

Chips are brought in from silo storage (next month—story on pulpwood production and preparation) to the digester room via Goodrich rubber conveyor belt. This belt travels on Link-Belt rolls. The chips are fed into the digesters via a travelling tripper chute. Each cook is of 90 tons of wet chips, period is 6¼ hours, and 22 tons air dried pulp are produced.

Digesters are equipped with Bingham circulating pumps as well as Bingham stock and red liquor pumps. Other equipment includes Ingersoll-Rand gland water and condensate pumps, Chemipulp educators for relief gases, Alaskan Copper heat exchangers and digester blowdown condenser, Hydraulic Supply pressure absorption tower, National Tank & Pipe wood stave acid tanks and a Moore Dry Kiln chip drying oven. Floor drains in Pulping Group are lined with Stebbins acid resistant brick.

Digester cooking is performed with automatically controlled steam flow to the Esco heaters and automatic pressure control on relief gas. The side relief is regulated by automatic flow control and a timer. In the MgO system there are no blow tanks. Dump tanks beneath digesters are used, as described in PULP & PAPER's story on the Ketchikan, Alaska, mill. (October, 1954). Brick linings for dump tanks were by Chemical Linings Inc.

Butterfly valves of various sizes by Keystone Valve Corp. with Hammel-Dahl air operators are used in the stocklines. For control of flow and for steam and process lines, the mill employs Hammel-Dahl air-operated control valves with globe bodies. Valve parts in contact with process solution are made of 317 stainless steel.

Central Control for Washing, Bleaching

The washing, screening and bleaching operations are all controlled from a single bleach plant control room. This is a free-standing glass-enclosed room which stands between the unbleached and bleached washers. It is located adjacent to and on the same level as the digester operating floor.

The flow of pulp to the unbleached washers is as follows: pulp flows by gravity from the digesters into the brick catcher, from which it is pumped into the four Chicago Bridge & Iron digester dump tanks. A variable-speed pump sends it from there to the red liquor washers.

The four Impco washers are all on the washer operating floor of the pulping group. The red liquor washers are stainless steel and operate with counter-current washing. Each washer measures 11½ ft. in diameter by 16 ft. wide.

Impco also supplied four vibratory knotters of stainless steel construction. These are standard 56 in. knotters with revised perforated plate area with a fifth again as much effective screening area as early similar models. Lubrication of the knotters is accomplished with an oil mist system.

Knotters are installed between the third and fourth stages of washing. The unwashed pulp goes through the first three stages and then is dropped into a soak chest and then run through the knotters. Next step is the fourth stage washer. The knots are pumped to the bark presses where additional wood is recovered for burning in the power boiler furnace.

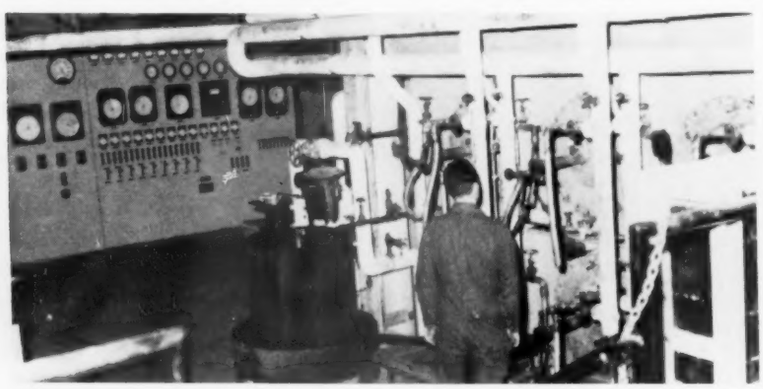
Primary and secondary screening is done with nine Cowan Mark E screens.

In screening the unbleached pulp, four Impco Dunbar-drive flat screens perform the job at the third stage of screening. There is a similar set-up for the bleached pulp before it enters the wet end of the machine.

There are Impco 11½ x 16 ft. bleach washers with Chemical Linings tile for the three stages of bleachings: chlorine, caustic extraction and hypochlorite. Kamyr steam mixers are used in caustic and hypo stages. Pulp passes through a high density caustic reaction cell, which uses Impco circulators and dilution nozzles. Washer hoods and fans were supplied by J. O. Ross.

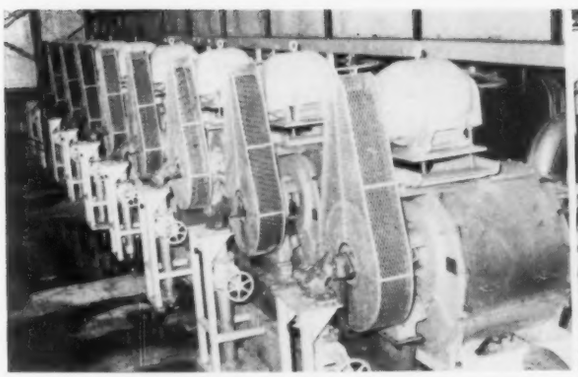
Installation of 15 Mark E Cowan screens furnished by Appleton Machine Co. is believed to constitute the first instance that such screens have been used in the west for all pulp screenings, both bleached and unbleached. Nine screens are in the bleach plant, six in the machine room. All agitators in Pulping Group were supplied by James Brinkley Co.

The hypochlorite storage tank by CB&I has a flexible-rigid ("Fligid") lining of 3/16 in. sheets of polyvinyl chloride. The tank top is covered with



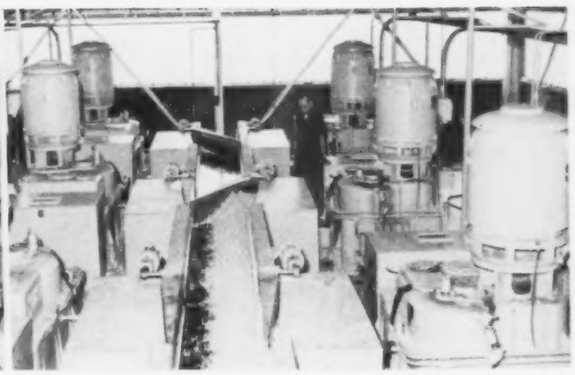
Controls Grouped Together

Babcock & Wilcox MgO recovery boiler gets a check. Evaporator controls in background. Controls for turbines, water plant, evaporators, power boiler and recovery furnaces are within a few yards of each other.



First Time for Screens?

Nine Mark E Cowan screens perform primary and secondary screening of brown stock. A similar installation of six Cowans cleans incoming bleached pulp in machine room. This is believed to be first time in West where screens did both jobs.



Pulp Agitation for Bleach Cells

Whirring agitators by James Brinkley Co. keep pulp stirred in the eight batch bleach cells in hypochlorite stage. Brinkley sheer gates on belt are remotely operated from bleach plant control room.

spray-type vinyl of .015 in. thickness. Chemical-Proof Corp. of Seattle performed the installations.

Recovery Group is Unusual; Some Features are Unique

The evaporation, recovery, power, and acid making facilities are located in and around a concrete, steel, and Careystone building known as the Recovery Group. A feature of this group is that evaporator and turbine room operating floors and the furnace firing deck are all at a common level.

Power generating facilities consist of two General Electric turbo-generators rated at 9375 kva each. Unit No. 1 is a condensing unit and is equipped with an Ingersoll-Rand surface condenser. Unit No. 2 is a non-condensing type. The high voltage switchgear by Westinghouse is on the turbine room operating floor. Primary and distribution voltages are 13,800 and 600 respectively.

At the heart of this group are two Babcock & Wilcox red liquor recovery units with a rated steam capacity of 115,000 lb. per hour each and one B&W oil and hog fuel fired power boiler rated at 150,000 lb. of steam per hour. Steam is produced by these three units at a pressure of 850 psi and a temperature of 825° F.

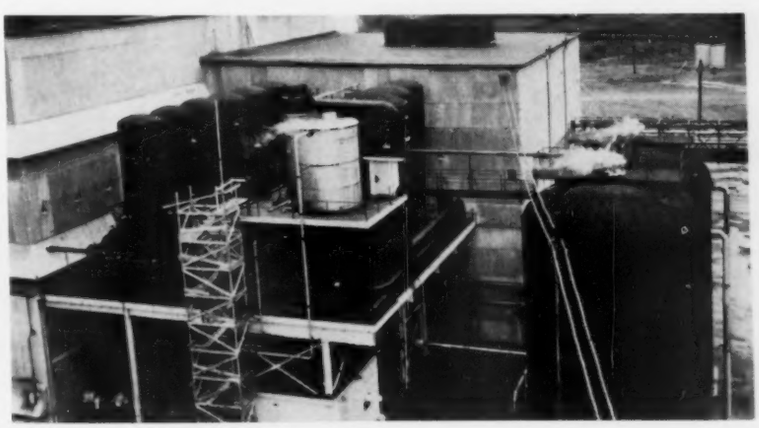
The feed water system servicing the three boilers features a complete demineralizer installation capable of producing 800 gpm of demineralized water containing less than 1 ppm of silica and 3 ppm of disolved solids. Infeed water contains some 20 ppm of silica and an average of 90 ppm of dissolved solids. This installation was by H. M. Mueller Co. of Minneapolis. All controls are automatic. The trend, as exemplified here, has been to install one whole system of ion exchange in purifying boiler feed water and place it under automatic control so it will operate according to demand. A Cochrane deaerator has an outlet capacity of 500,000 lb. per hour and three Ingersoll-Rand pumps are rated at 1100 gpm each at a head of 2630 ft. Automatic controls on all furnaces were by Bailey Meter Co.

Both forced draft and induced draft fans for the power boiler were by Sturtevant; mechanical cinder catchers are Western Precipitation "multiclone." Some 60% of the required hog fuel for this unit comes from pulp mill bark, bark fines recovered by nine Sweco screens, and undersized chips. The remaining 40% of hog fuel is supplied by local sawmills. Link-Belt and Hewitt-Robins equipment are featured in hog fuel handling and conveying.

The two recovery units are generally similar but larger than original units at Ketchikan Pulp. The major difference between Grays Harbor and Ketchikan is that the Grays Harbor installation has one "line" of cooling and absorption towers following each recovery unit, whereas, at Ketchikan one "line" was built to service both units. Air heaters following the Grays Harbor units are equipped with shot cleaning systems by Diamond Specialty Corp.

Each recovery furnace has a primary I.D. fan located after the acid plant absorption towers and an auxiliary I.D. fan located after multiclones. The purpose of the auxiliary I.D. fan is to allow furnace startup operation on oil when the acid plant is down. Primary I.D. fans were neoprene-lined by Chemical Proof Construction Corp.

Red liquor fuel for recovery units is pumped from No. 1 washer filtrate tank at the Pulping Group to two 30 ft. diameter by 40 ft. high Chicago Bridge storage tanks, brick lined by Chemical Linings, Inc., adjacent to the evaporator area. The weak liquor is pumped by a 317 stainless steel Bingham pump through a Foxboro



An Unusual Evaporator

Nine-body sextuple effect evaporators for MgO cycle supplied by Conkey Division, Chicago Bridge & Iron. Evaporator circulation is effected for first time by nine spring-mounted Bingham pumps.

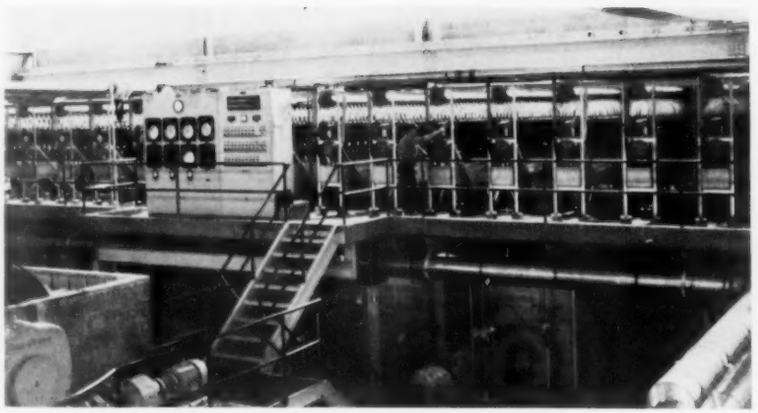
magnetic flowmeter to evaporator effect No. 6.

A nine body, sextuple effect, MgO Chicago Brige Conkey evaporator has forced circulation of liquor, accomplished by nine spring-mounted circulating Bingham pumps (one per body), driven by General Electric motors through Western Gear reducers. A 12 ft. diameter by 14 ft. high type 317 stainless steel vapor condensate tank and three heavy red liquor 15 x 40 ft. storage tanks with Lukens stainless clad plate mounted high in the Recovery Group building were fabricated and erected by Hydraulic Supply Mfg. Co.

Unlike black liquor recovery units, there is no molten pool of recovered chemicals at the bottom of the furnace. Instead, all chemicals are recovered from the flue gases. Magnesium oxide in the form of a fly ash is stripped from gases by multiclones.

MgO ash that has been recovered in the multiclones is fed through separate sluicing systems to a single Dorr-Oliver drum-type mud washer that serves both units. Featured in each sluicing system is a retention tank for the removal of soluble compounds. The reclaimed cake from the washer is slaked in two 8 ft. dia. by 12 ft. high slaking tanks after which it is stored as a slurry in a single 12 ft. dia. by 12 ft. high storage tank for re-use in the acid making cycle. Make-up MgO slurry is added at this point. Agitation in the slaking and storage tanks is by Eastern Industries, 132 ft. long shaft agitators through Tower Equipment Co. These have Falk reducers.

Makeup MgO slurry is purchased from Kaiser Aluminum & Chemical Co. and shipped in tank cars from Salinas, Calif. Each car as received holds approximately 40 tons of slurry at a consistency of about 35%.



Final Pulp Cleaning Stage

Prior to machine cleaning is effected by 1000 unit battery of Bauer Centri-cleaners. Installation occupies mezzanine in corner of machine room.

Acid Plant is Special For MgO Base Plant

Each recovery unit has its own "line" of acid plant towers, consisting of a cooling tower, three absorption towers in series, and a wet type precipitator. The point of entry for gases into the acid plant is the cooling tower, where they are cooled from about 350-400°F. to approximately 100°F. Each cooling tower is a brick-lined steel tank, 19 ft. dia. (inside tile) by 51 ft. high. The steel tanks were furnished and erected by Hydraulic Supply. Brick linings in the acid plant were by Stebbins.

Each cooling tower has a stainless steel heat exchanger by Alaska Copper & Brass Co. Cooled gases pass out of the top of the cooling towers, through a duct to the bottom of absorption tower "A". In absorption towers "A", "B" and "C" the circulating acid flows from top to bottom, whereas, the gases flow from bottom to top in towers "A" and "C" and from top to bottom in "B" tower. All absorption towers are of reinforced concrete construction with domed roofs and cone bottoms. They have Stebbins acid brick linings and 20 ft. of tile packing each.

New cooking acid has its origins in the absorption towers. Briefly, the process is to circulate water in the towers and add MgO slurry as required. SO_2 is reclaimed from the flue and burner gases by absorption and combination with the circulating mixture. As raw acid is drawn off makeup water and slurry are added.

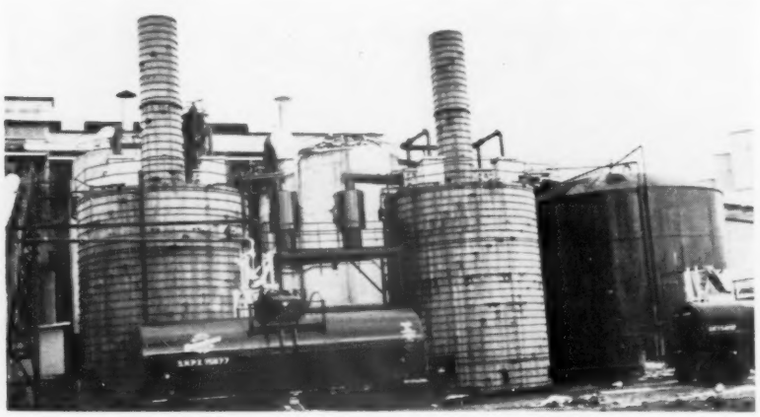
The gases leave at the top of "C" tower, are conveyed to the induced draft fan, mounted at ground level for easy maintenance, then blown through a Research Cottrell wet-type electrostatic precipitator, housed in wood stave tanks by National Tank & Pipe Co.

Some recovery of chemicals is accomplished with these precipitators, but their primary purpose is to remove sulfuric acid droplets, and SO_3 fume from the waste gases.

Raw acid is drawn off at the two "A" towers and pumped to wood stave acid settling tanks, then through Alaska Copper stainless steel heat exchanger to the top of the Hydraulic Supply steel fortification tower, 6 ft. in diameter, 70 ft. high, lined with Stebbins acid-proof brick. Fortifying medium is SO_2 gas from two Kimberly-Clark jet type sulfur burners, each rated at 15 tons per day, furnished by Chemipulp Process, Inc. Filtered acid goes to the pulp mill.

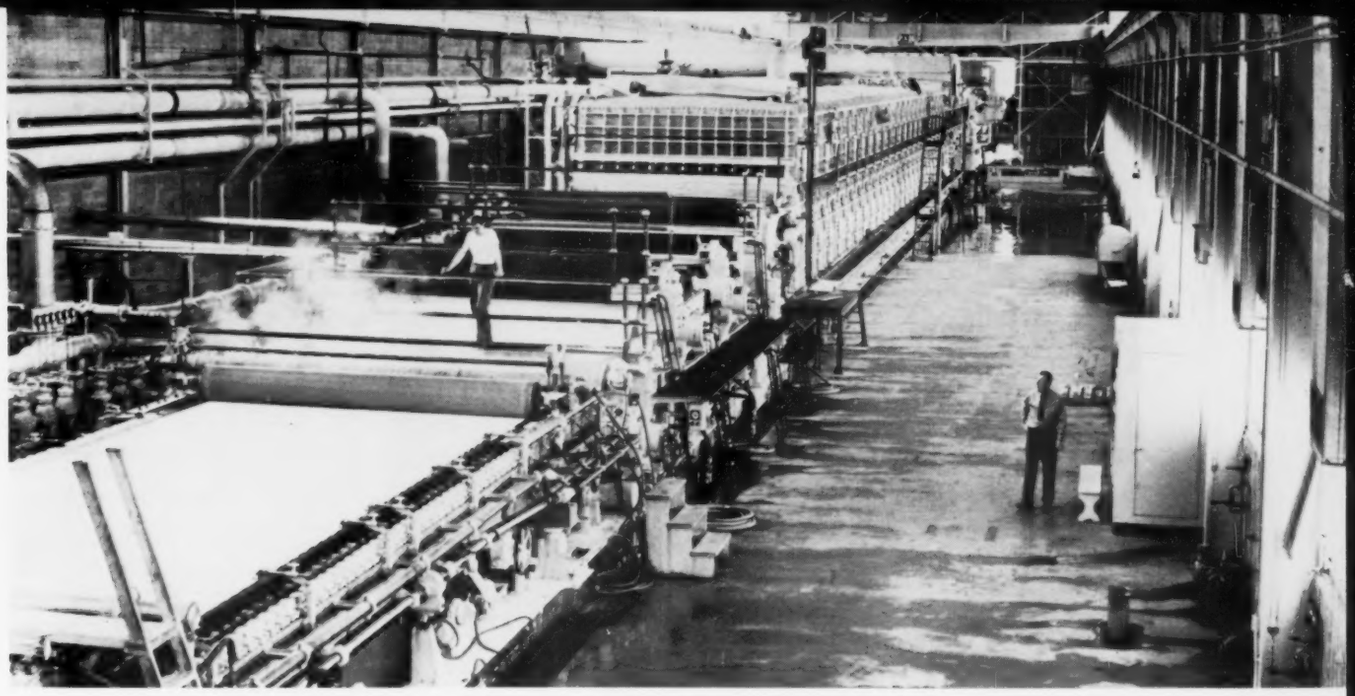
A secondary stainless steel spray tower equipped with Alaska Copper heat exchanger further cools gas to 90°. The tempered water from this and other acid plant heat exchangers is pumped to the Pulping Group for use in process.

Upon leaving the secondary tower



Precipitators in Wood Structures

In foreground is insulated tanker with molten sulfur from Alberta. Structures house Research-Cottrell electrostatic precipitators with exhaust stacks protruding.



Up to 60% of Capacity in Month
Sheet of high quality pulp is formed on Fourdrinier section of Rice Barton machine. This is a left-hand machine with a design speed of 500 fpm. Wire size is 95 ft. x 156 in. wide. Dryer section follows.

the gas passes through an 18 in. lead gas fan built by G. D. Jenssen Co., Inc. and furnished by James Brinkley Co. From the discharge of this fan a portion of the gas passes through the fortification tower on its way to the absorption towers, while the balance of the gas goes to the absorption towers direct. SO_2 gas is handled in lead pipe.

Sulfur is purchased from British American Oil Co. and shipped from Calgary, Alta.

Evidence of acceptance of more plastic materials is the role played by various coatings and linings. In the primary induced draft fan installation for the recovery furnaces, for example, the fan rotors are covered with .110 in. thick liquid neoprene by Chemical Proof Corp.

Machine Room Layout Is Neat and Orderly

Careful engineering design work which went into the machine room has resulted in a very neat and orderly installation with a bare minimum of clutter.

Bleached pulp is pumped from the stock storage chests and enters the machine room via stainless steel pipe furnished by Northwest Copper and is screened by six Mark E Cowan screens for preliminary cleaning.

The stock is then pumped to the four-stage bank of some 1000 Bauer cleaners which are equipped with type 600 hoses which are located on a mezzanine to provide gravity flow to the Dorr-Oliver vacuum deckers. The deckers operate in vats of Chemical Linings tile and are powered by Western Gear drives equipped with Dynamatic speed controls and GE motors.

Stock is next pumped from the decker repulper by means of a Bingham pulp hog to the stock chests and thence to the machine multipass headbox designed and built on the job.

Stock consistency to the Rice Barton non-shaking removable Fourdrinier is controlled by means of a basis weight instrument assembled by WTCo engineers. The wire on the machine is 158 in. wide.

The press section and the dryer section were also furnished by Rice Barton. The former includes three presses, the first two of which are the suction type and all of which are hydraulically loaded by means of a Vickers power unit. A Vickery felt conditioner was furnished for the first and second press felts.

The 500 fpm vacuum dryer contains 52-60 in. diameter by 152 in. face measurement dryer rolls designed for 75 psi steam pressure. Also there are six seal rolls, three ingoing and three outgoing, to hold vacuum at points where the pulp sheet enters and leaves. The dryer total length is 160 feet.

As the sheet leaves the dryer it passes through a Brinkley sheet cooler on its way to the Lamb-Grays Harbor cutter, layboy and conveying and stacking equipment. The cut and automatically piled sheets reach the swing table where they are directed over a Toledo scale to the Washington Iron Works bale presses; here the 400-lb. piles are hydraulically compressed into bales.

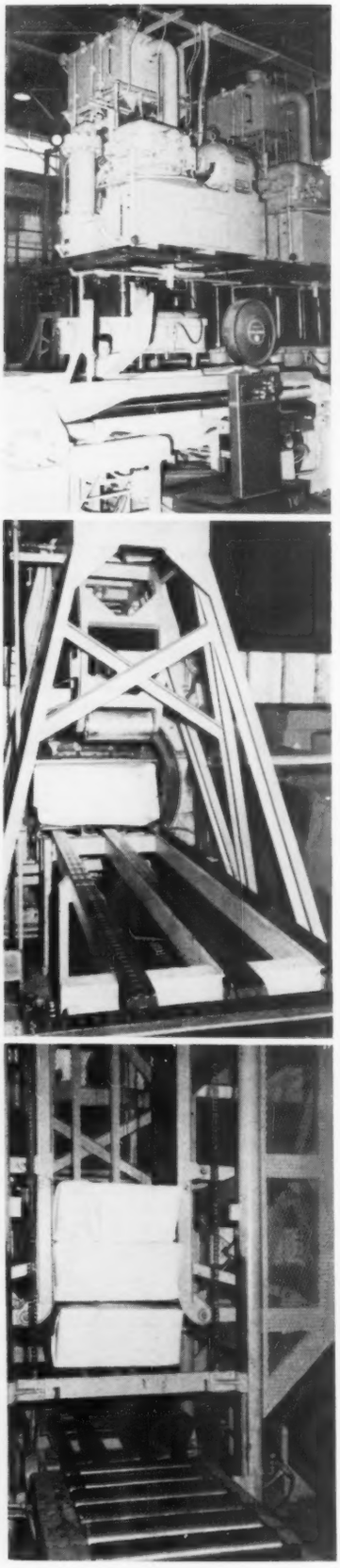
Wrappers are placed on the bales and they pass through two Signode-Parker wire tying machines to be conveyed to the bale stacker, which accommodates five bales, equal to a ton of pulp. Here the bale weight is checked and the stacked bales conveyed to a fork lift station for transportation to the carefully palletted bale piles in the warehouse, or directly loaded into railroad cars.

The 12 ft. diameter James Brinkley air cooler serves an important function in the pulp drying and finishing operation. This big suction drum utilizes electrostatically filtered air, which is sucked right through the sheet. Excess moisture is thus evaporated out of the sheet and the temperature of the sheet is thus reduced. This additional drying and cooling prevents color degradation in the sheets of baled pulp, which might otherwise result if it is baled while too hot. The width of the cooler is same as the wire: 156 in.

All machine drives were furnished by Rice Barton. The couch, first, second and third presses, and the in- and outgoing seal rolls are powered through lineshaft-driven hypoid differential units with draw control and an Airflex clutch in each sectional drive. The dryer is powered at two main intake shafts which have worm gear drives directly coupled into the lineshaft without draw control. The entire dryer section can be started or stopped by a Fawick Airflex clutch placed in the lineshaft. The lineshaft also drives the sheet cooler and the cutter.

The lineshaft prime mover is a 400 hp 150 lb. G.E. steam turbine and the dryer rolls can be turned by an electric Sunday drive without turbine power.

Condensate is removed from the dryer by means of a Ross-Midwest Fulton system and the backside bearings are lubricated with a Bowser system as are the differential drives, these systems furnished by Rice Barton. Vacuum is produced on the Fourdrinier flatboxes, the couch roll and



Steps to Baling of Pulp

(Top) Overall view of huge hydraulic press shows worker evening up stacks of 30 in. pulp squares to 400 lbs. each. Press is by Washington Iron Works, rated at 1000 tons.
(Middle) Outer wraps of pulp are tightly bound to 400-lb. bale with Signode-Parker wire tying machine, one of two.
(Bottom) Lamb-Grays Harbor elevator stacker is ingenious. Picks up successive bales, holding them tightly between flat surfaces as they are elevated. When five bales are stacked, pile moves forward on rollers to storage or loading.

the press rolls by a battery of five Nash H-10 vacuum pumps. Dryer vacuum is maintained by a barometric condenser, steam jets, intercondenser, separator and dry vacuum pumps furnished by Ingersoll-Rand, who also furnished the building compressed air system.

The building heating and ventilating system was furnished by Drew Engineering Co. Dry end broke is accommodated by a 10-ft. Shartle Bros. Hydrapulper.

Cable troughing is used for supplying power to the machine room equipment from the substations located in the adjacent warehouse, which provides an ideal location for power transmission lines, since it is clean, dry and cool.

Unusual Contract for High Degree of Instrumentation

Panellit Service Corp., Skokie, Ill., engineered and provided all panels, instruments and consoles (except for power and recovery group). Installation was by the general contractor, Hoffman Construction Co. In accordance with a long-established Weyerhaeuser purchasing policy, Panellit worked through Pacific Northwest representatives of the instrument manufacturers.

This marks the first time Weyerhaeuser has ever contracted out its instrument work in such fashion. Instrument companies which helped supply products through Panellit include Bailey, Taylor, Foxboro, Moore Products, Hammel-Dahl and Minneapolis-Honeywell. Panellit provided flow sheets and specifications for all process areas together with considerable instrument panel fabrication.

The general philosophy used was to treat each process area as a separate operating area, each with its control center. These were as follows: digester area, brown stock washing area, bleach plant area, machine room area and acid plant area.

The information is transmitted to control centers by the use of pneumatic transmitters. In so doing, there are no process connections brought into the panels, thus eliminating the chance of leaking fluids corroding the panel piping and wiring. The panel-mounted instruments are, in general, of the large case receiving type. They are of the indicating type, except where a record is absolutely essential. The miniature case instruments are used wherever bench type consoles are employed. This permits a great concentration of process information in a small area.

The rear of panel instrumentation, piping, and electrical is protected by formed doors sealed with a ¾ in. thick rubber gasket. This eliminates seepage of spray from water hose, breathing of corrosive atmosphere, etc. The door hinges are of stainless steel to insure continuous door life. The panel copper tubing is cadmium plated to eliminate the start of copper corrosion. In general, there are panels separate from the pneumatic to house the electrical and pneumatic work, the electrical is completely enclosed to eliminate the hazards of open electrical terminals and contacts.

Field electrical conduit is brought into closed terminal boxes. This gives a neat, workmanlike job. The pneumatic tubing is also brought into a terminal box, just as in the case of the electrical. The tubing is closed with armor, and the armor shield is brought to the terminal box. Within this enclosure, the tubes are fanned out to their respective tubing bulkhead union.

Panellit is negotiating a contract with Weyerhaeuser to cover all routine and emergency instrument maintenance on a contract basis, a standard service performed by Panellit.

How Effluent System Works at Cosmopolis

The WTCo research department at Longview built a model of the Chehalis River from the town of Montesano, including Grays Harbor as far west as the town of Westport, to aid in design and location of facilities and schedules for dumping effluent.

The mill has two sewer systems, a "sweet" and a "sour." There is an automatic gate on the sweet sewer reservoir opened for discharge only on the outgoing tide. The holding reservoir is actually an old slough adapted for impounding purposes. Relatively clean mill waste waters, such as filter plant backwash water, hydraulic barker effluent (after screening), and excess machine room water, are diverted to the sweet sewer.

Sour effluent is transmitted through a 15,000-ft. long, 42 in. wood stave pipe made by WTCo's lumber division to a series of four ponds and discharged into Grays Harbor on the outgoing tide only, via a remotely

operated gate. The pipe is held together by steel bands, sheathed in polyethylene to prevent rusting. All fittings are 317 stainless steel by Alaskan Copper and rubber covered and lined by Chemical Proof Corp.

Technical Director Walseth told PULP & PAPER, "I believe one of the main items of interest on our new mill is the waste disposal system. It was designed and laid out with a great deal of care. One interesting feature of this system is the method of measurement of flow. There is a venturi flow meter on the 'sour' waste going to the ponds. The laboratory has charts on which are recorded pond and tide levels and the amounts of waste going to the pound, thus insuring optimum efficiency in the discharging action. These accurate records along with test results on composite samples will be turned over to the state periodically for inspection."

The control gates are activated from the mill laboratory.

Fully Automatic System For Water Treatment

Water is brought by gravity flow from Lake Aberdeen in the foothills of the south Olympic Mountains in a 48-inch pipeline. To supply the 30 mgd of high quality process water for the mill, a treatment and filtration plant was designed by Northwest Filter Co. of Seattle. Automation is extensively employed. No operator will be required at the filtration plant during normal operation. All operations, including backwashing, are performed by automatic controls. Raw water and treated water samples are continually supplied to the mill laboratory where the shift chemist may observe flocculation results and make jar tests.

Immensity of Water Treatment Plant

. . . is caught in this damatic shot from top of pulping group. Plant was designed by Northwest Filter Co. for a production of 30 mgd of high quality process water.

The plant has two circular basins and eight double wash filters arranged in a rectangular configuration. This facilitates future expansion. Concrete structural engineering was by Weyerhaeuser engineers.

Water is first introduced into an initial mixing chamber, with the chemicals being injected into the raw water line just ahead of this chamber. From the initial chamber the flow is directed to the mixing section of each basin. Primary mixing is in a circular section at the center of the primary mixing chamber. Flow is directed to a secondary chamber and then through five coagulation chambers, in pie-shaped sectors of a circle, located in the center of the annular settling basin. All flow control devices in the coagulation chambers are fabricated with stainless steel.

For mixing and coagulation, no mechanical devices or moving equipment is employed. The chemicals are mixed and the water brought to the state of pin-point flocculation by hydraulic mass mixing. It is necessary to continually bring the small, immature floc particles together to allow them to agglomerate to a size and density that will settle. Water flow must be controlled in such a manner as to avoid breaking the delicate floc.

After coagulation, water is distributed in the settling basin by means of a "venturi" wall. Water is withdrawn from the basin over a weir into a flume, thence to the rapid sand filters with stainless steel laterals. To reduce mechanical equipment requirements, the filters are of the "doublewash" type, i.e., two filters are manifolded so that a single set of sluice gates and valves function to serve both filters, but the filters are backwashed seperately. All functions of control are performed by a pneumatic control system. Sluice gates and valves are actuated by mill air, while the controls are supplied with mill instrument air. A "demand" control system maintains a constant level in the clearwell. Basin levels are controlled at constant level, with raw water inlet valve also responding to mill demand.

Backwashing is automatic, and the cycle may be initiated automatically either by a measured, pre-set loss of head or by a time cycle controller. Two phases of the backwash cycle are electrically monitored to avoid any possibility of the backwash pump causing flooding or running against closed valves.

Raw water flow is measured, recorded and totalized. It is from this measuring device that the chemicals are automatically proportioned over

The Engineers

Beaming for PULP & PAPER's camera is Weyerhaeuser Pulp Division construction staff, headed by MERRILL ROBISON (with striped tie, center). Seated at drawing board are DON WOODEN (l) and PETE LANDRY; missing, HAROLD SEMPLE. Other members of this young crew, standing l to r, are: GENE ELLIS, RAY MILLER, BILL FENTON, BURNELL GOODNESS, Mr. ROBISON, KEITH LAMB, JOHN FIELDS, DOUGLAS McARTHUR and BILL HOSS. Absent: LEE JOHNSON.

the entire plant.

Control panels are in an enclosure at the filter plant. Any single function of the plant may be switched from automatic and performed by manual control. An alarm system, both local and remote, indicates abnormal high or low clearwell level. Turbine room instruments show flow and levels. American Pipe & Construction Co. furnished storage tanks and concrete and steel cylinder pipe.

Electrical Distribution Efficiently Set Up

The distribution system utilizes the simple primary radial for non-essential power centers and the primary selective radial for essential power centers. Both generation and distribution are at 13,800 volts. Secondary distribution is by a secondary selective radial system at 600 volts for motors 400 hp and below and a simple radial at 2400 volts for motors above 400 hp.

Power is fed from the turbine room to the other departments by means of 3-conductor #4/O grounded neutral Okonite aerial cables. A stainless steel messenger serves to support the cable and is also used for grounding.

A total of 624 motors comprising 29,065 hp is the total connected hp load. Serving this load are 21 double-ended 1000 kva transformers, two single-ended 1000 kva transformers and one single-ended 2500 kva transformer.

All 600 volt motors above 200 hp which have an infrequent starting cycle use electrically operated DB-25 air circuit breakers for starting equipment. Across the line starting is used, including the 1750 hp chipper motor.

An extensive cable tray system is in use in the machine room, pulping group, filter plant, turbine room and wood plant. When separate control and power trays are not used, a divider strip serves to segregate power and control lines. Tray was supplied by Cope trough.

Lighting consists of fluorescent mercury, fluorescent and incandescent type luminaires. The lighting levels are very satisfactory in all areas.

Head Men at Cosmopolis
(L to r) Resident Manager JOE BROWN, Pulp Mill Supt. HERMAN JORGENSEN and Technical Director CURT WALSETH.

Motor control centers are of back-to-back construction, utilizing a common 600 amp bus. Turbine room switch gear, power centers and motor control centers were supplied by Westinghouse Electric Corp. The two 7500 kw—.8 P.F. turbine generators and all motors were supplied by General Electric Co.

Who Are People Who Built and Run Cosmopolis

Top hourly operators were brought to Cosmopolis from other company mills. Cosmopolis has 170 shift employes and maintenance men. Counting supervisory and office personnel, the total payroll is around 250. The 600 employes of the Clemons Operation—forestry and logging division—have their own personnel department.

Under head construction engineer Robison, Harold Semple supervised the machine room, warehouse, office, and laboratory; Donald Wooden handled the filter plant and recovery group; and Pete Landry was in charge of the pulping group.

Others in Mr. Robison's group include: Burnell "Bub" Goodness, in charge of electrical engineering; Gene Ellis, electrical; Keith Lamb, underground piping and plant site; Douglas McArthur, recovery group; Ray Miller, chip conveyors, screen room, hog fuel and wood room; Lee Johnson, machine room and warehouse; John Fields and Bill Fenton, pulping group. Joe Dixon and Dan O'Shea, of the Tacoma staff, engineered the woodroom and water lines. Claude Fargo, consultant, worked on the structural part of the new mill construction.

Cosmopolis manager, Joseph C. Brown, first worked briefly for Weyerhaeuser just 10 years ago as a relief shift chemist in the sulfite mill at Everett, Wash. He took chemical engineering at Texas A&M and received advanced degrees at the Institute of Paper Chemistry. Before World War II, he worked a short time at Thilmany Pulp & Paper Co., then served four years in army chemical warfare, including the Pacific theater. In 1949 he joined WTCo at Longview as project chemist, progressed to technical director and pulp supt. at Springfield, Ore., and assistant manager at Longview.

Technical Director Curt Walseth formerly was with the Weyerhaeuser Pulp Division research dept. in Longview. Other supervisors, title and former position and location with Weyerhaeuser are:

Herman Jorgensen, pulp mill supt. (sulfite shift foreman, Longview)

Wayne Schuknecht. supt. of power and recovery (supt. power and recovery, Longview)

Ray Graham, chip plant foreman (woodmill, Longview)

Walter D. Watt, plant engineer (plant engineer, Springfield)

SEEN AT COSMOPOLIS (left to right): E. H. OLSON, C. WALSETH, G. WRIGHT, A. CLICK; D. WOODEN; J. BEAVER, construction project manager for Hoffman Construction Co.; J. FRARY, W. D. WATT, I. C. MURRAY, R. CHANEY, K. W. SMITH.

(Left to right) W. SCHUKNECHT; G. BAGNELL; H. RITTER, E. W. MARX; G. MOLITOR, M. PETTIJOHN.

(Left to right) D. WILSON, A. JACKSON; R. MILLER, R. GRAHAM; R. HENDERSON, L. MILLS; T. ANGER, R. BRUNDAGE; D. J. BRULE.

Dale Wilson, personnel manager (personnel assistant, Longview)

Howard Johnson, accounting supervisor (accountant, Longview)

Erwin H. Olson, chief chemist (chemist, Longview)

Karl W. Smith, master mechanic (lead tinner, Longview)

Howard D. Ritter, chief electrician (lead electrician, Longview)

Gordon A. Bagnell, shift engineer (new to Weyerhaeuser)

Lloyd Mills, shift engineer (fireman, Longview)

Donald J. Brule, storekeeper (receiving clerk, Longview)

Charles R. Bundage, shift foreman (shift foreman, Springfield)

Charles McMillan, shift engineer (fireman, Longview)

Roy C. Chaney, maintenance foreman (pipefitter, Everett sulfite)

Roy E. Countryman, shift foreman (chemist, Longview)

Raymond D. Henderson, shift engineer (ex-fireman, Everett kraft)

Gary P. Molitor, shift foreman (machinetender, Longview)

Arthur J. Click, instrument foreman (instrument mechanic, Everett kraft)

Edward W. Marx, electrical foreman (new to Weyerhaeuser)

Ivan C. Murray, maintenance foreman (millwright, Longview)

Marvin Pettijohn, maintenance foreman (new to Weyerhaeuser)

Gordon L. Wright, chartroom foreman (shift chemist, Springfield)

Chet Hobbs, shift foreman (bleacherman, Longview)

J. G. Hale, office manager (office manager, Clemons Operation)

Jim Frary, purchasing agent (purchasing dept., Longview)

Frederick Billings, public relations manager (Tacoma office and Springfield)

1,100 Delegates Expected At Cincinnati Meeting

Fifteen program sessions and 14 discussion sessions comprise the program for 12th annual TAPPI Engineering Conference Sept. 23-25 at the Netherland-Hilton hotel in Cincinnati. L. R. Clark, Link-Belt Co., registration chairman, says nearly 1,100 delegates are expected. Tours on Sept. 26 will be to Mead's Chillicothe mill, Black-Clawson, Moraine Paper and Cincinnati Gas & Electric plants and the Robt. A. Taft Sanitary Engineering Center, with free bus service.

Motor failures, power systems, digester corrosion, fluid mechanics, automation, maintenance are among major subjects.

Crown Zellerbach's new system of transporting and handling noodle pulp for its Antioch mill will be discussed (see PULP & PAPER's "New Industrial Philosophy equals New Mill," pp. 48-59, May 1957 issue). A new event will be a panel on paper mill noise abatement, a subject featured in several recent P&P articles, including "Debunking Notions About Noises," Dec. 1956 issue, pp. 37-39.

How Top Men in Champion Earned Their First Dollar

Reuben B. Robertson Sr., chairman of the board, Champion Paper & Fibre Co., reveals his first regular paying job was carrying the chain for a surveyor crew of the Cincinnati Water Works. He earned 25¢ an hour.

Mr. Robertson didn't know each worker had to bring his own mattress and blankets. For a week he had to sleep on an iron cot, equipped with steel springs and nothing else.

John Ramsey, general supt. of paper manufacturing for Champion, who has been with the company since 1919, said his first paying job was delivering papers on a 4 a.m. route. His first job with Champion was broke loader.

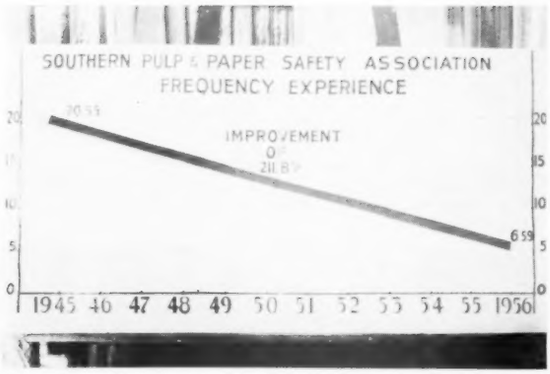
George Steiner wrote a story in Champion's "Log" about how these and other men in Champion earned their first dollar.

New TAPPI Section

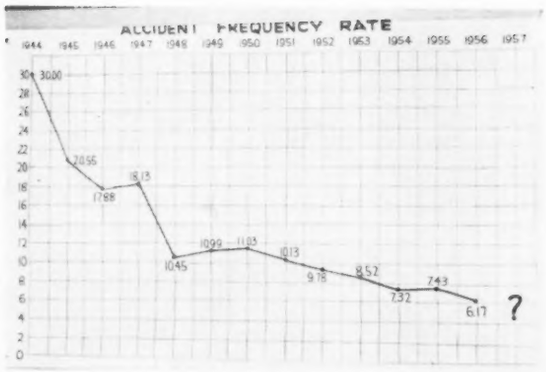
A new TAPPI Section has been organized in St. Louis. E. P. Gillan, who recently retired from Anheuser-Busch, but continues as a consultant, has been one of the group's leaders.

New Officers Elected

Officers for Kalamazoo Valley Section of TAPPI in 1957-1958 are (l to r): P. D. GRAHAM, treasurer, E. I. duPont de Nemours & Co.; R. HALL, chairman, Allied Paper Corp.; E. E. STEPHENSON, vice chairman, Sutherland Paper Co.; W. O. KROESCHELL, secretary, Michigan Carton Co.



This Is How South's Safety Record Improved



Will Southern Frequency Rate Keep Dropping?

"If You Want To Be An Is'r . . ."

Southern mills set best safety record yet; seek answers on how to make their 6.1 frequency rate even better

● The safety engineer of a large Southern pulp and paper mill recently asked several employes just what safety meant to them. A Negro laborer, speaking in the sometimes perplexing but frequently basic philosophy for which the Southern Negro is noted, answered:

"If you wants to be an is'r, you better watch them unsafe acts—otherwise you's gonna be a has-been."

The Southern Pulp & Paper Safety Assn., which includes 63 pulp and paper producers, is becoming noted for its attempts to make its people "is'rs" instead of "has-beens." The accident frequency rate among these mills—which include the largest in the world—has been dropping steadily. In 1954, injuries per million man-hours was 7.32; by the end of 1956 it had dropped to 6.17. The leading mill, safetywise, Georgia Kraft Co., Macon, Ga., rang up 1,281,034 man-hours without a single accident. A smaller mill—Big Island, Va.,—also had a perfect record. Others, like Champion Paper & Fibre Co. at Canton, N.C., scored impressive records. Champion chalked up 5,863,243 man-hours with only 15 accidents for a frequency of 2.55—almost four points below the average.

At the association's meeting this year in the George Washington Hotel at Jacksonville, members picked away at the cause and effect for the age-old question: "To be or not to be." From discussions came these observations: Human failure is the cause for 83 to 90% of all accidents, and safety must be a condition of spirit.

They Were Hosts of Safety Confab

From left, R. E. PHINNEY, gen. mgr. of Container Corp. of America Fernandina (Fla.) mill; WESLEY M. DIXON, pres. of Container Corp. of America, who delivered luncheon speech; N. L. COCHRAN, Fernandina plant mgr.

Who Is "Accident Prone?" . . .

At Union Bag-Camp in Savannah, an experiment was tried to determine what causes people to be "accident prone." As reported by Charles Dougherty, industrial relations dept., the complete work records of all persons with more than three accidents requiring doctor attention the previous year were studied. From these, the 10 men with highest accident frequency were picked. These 10 men had an accident on the average of every six months—10 times average.

Some facts Union Bag-Camp learned: None of these men realized they were "accident prone"—all of them thought their accidents were caused by circumstances beyond their control; all were in good health, but five of the ten needed glasses (these were supplied by the company on the same basis as safety glasses are provided, i.e., the company buys the first pair); five of the ten were considered above-average workers and four others were average; all had above-average I.Q.; six of the ten were in maintenance; none of them were malingerers—they all returned to work sooner than doctor ordered after an accident; all had higher "nervous tension" than is normal.

The company then set about improving accident records of these men. They were given complete physical examinations, required to take a first aid course (a good place to emphasize the importance of safety shoes, safety helmets, salt tablets, etc.), all underwent thorough per-

sonal interviews.

Mr. Dougherty said it was most important to gain the confidence of these men. The company emphasized that it merely wanted to help them. Their supervisors were directed to give these men personal attention. To gain the subject's complete confidence and learn as much about him as possible, be casual ("If he says, 'I like to burn down orphan's homes,' tell him, 'I do it myself all the time' "). Four of the men are still with the company, one reduced his accident frequency from 1½ times a year to ⅛ times a year; another from 2⅔ accidents a year to ⅔—overall improvement of 500%.

"The big secret seems to lie in personal attention," summed up Mr. Dougherty. "These men learned the truth in the saying, 'I am mine own executioner.' "

A few years ago at Harvard University, a group of workers were singled out at a company and given extra work incentives, one at a time. With each incentive, production among these men increased. Then the incentives were taken away—but their production continued to increase. When the workers had been returned to their former status with no extra privileges, their production had increased more than 200%. Conclusion: It was personal recognition, not incentives, which provoked the increase.

Some of the Experts . . .

CHARLES DOUGHERTY (top, left), Union Bag-Camp; FRANK ESKRIDGE (top, right), Florida State Highway Patrol; (bottom, left to right) ARELD SETHER, Container Corp. of America, ARTHUR LARSON, of Container Corp.'s new Brewton, Ala., mill, HARRIS WILLIAMS, International Paper Co.

Top Mills in South in Safety

● Two mills of the Southern Pulp & Paper Safety Assn's 63 members established perfect records in 1956—Georgia Kraft Co., with 1,281,034 hours, and National Container Corp. mill (now Owens-Illinois) at Big Island, Va., which worked 433,798 hours. In all, 37 had frequency rates lower than average.

But the record is still not good in woodlands operations. This year it was up to 19.12, a big increase over the 1955 rate of 13.90. Only one company, North Carolina Pulp Co., scored a perfect record. The second-ranking company's rate jumped sharply to 7.84.

In bag plants, as in box plants, accident rate was up over 1955. Albemarle Paper Manufacturing Co. at Richmond, Va., suffered no injuries in 331,449 hours. The overall bag plant frequency rate rose from 4.22 in 1955 to 7.17 in 1956.

St. Joe Paper Co. was the only box plant to make it through 1956 without an accident. The No. 2 ranking mill has a frequency rate of 5.37. The overall box rate rose from 8.77 in 1955 to 9.32 in 1956.

The first 15 ranking pulp and paper mills:

Mill	*Safety Director*	*1956 Man-Hours*	*Accidents*	*Rate*
1. Georgia Kraft Co., Macon, Ga.	W. M. Sloan, Jr.	1,281,034	0	0
2. National Container, Big Island, Va.	C. W. Wilson	433,798	0	0
3. Buckeye Cellulose Corp., Memphis, Tenn.	O. B. Windham	1,486,011	1	.67
4. Scott Paper Co., Mobile, Ala.	H. J. Smith	2,362,256	2	.84
5. Buckeye Cellulose Corp., Foley, Fla.	Dan Roach	1,090,444	1	.91
6. Flintkote Co., Meridian, Miss.	J. L. Chilcote	1,020,551	2	1.96
7. West Virginia P&P Co., Covington, Va.	Ralph Metz	3,984,365	8	2.01
8. Champion Paper & Fibre Co., Pasadena, Tex.	Otto Wagers	3,874,003	8	2.06
9. Rayonier Inc., Jesup, Ga.	J. A. Wilson	958,241	2	2.09
10. Chesapeake Corp. of Va., West Point, Va.	J. P. Dixon	1,311,351	3	2.28
11. Mead Corp., Lynchburg, Va.	A. W. Reynolds	1,215,712	3	2.47
12. Champion Paper & Fibre Co., Canton, N. C.	R. W. Robertson	5,863,243	15	2.55
13. Coosa River Newsprint Co., Coosa Pines, Ala.	R. C. Baker	1,854,442	5	2.70
14. Olin Mathieson Chemical Corp., Ecusta Div.	H. E. Newbury	2,555,089	7	2.74
15. International Paper Co., Moss Point, Miss.	Everett Long	2,556,546	11	3.09

The Question of Human Failure . . .

Three reasons accidents happen: The worker does not know his job well enough and is not alert for the unexpected; or he becomes overconfident when he knows his job and becomes careless; or he becomes preoccupied, stops paying attention to what he is doing.

"These are natural tendencies which lie behind 90% of our accidents," said Areld Sether, safety engineer for Container Corp. of America. "If you ask a man what happened to cause an accident, 99 times out of 100 he'll answer: 'I don't know what I was thinking about.' We encourage our people to report unsafe acts."

A Matter Of Spirit . . .

Tom Cleland, industrial relations and safety director, National Paperboard Assn., said:

"Failures on the part of people are not failures by them to think. Actually they were thinking—but about something other than safety. The best way to improve safety records is to make safety a state of mind—the same kind of spirit that turns a quiet boy into a deadly Marine in a month or makes a Georgian a died-in-the-wool Yankee baseball fan. People understand this type of spirit by identification and by instinct. You must make your people identify themselves with the effort you are making in their behalf."

Frank Eskridge, Florida State Highway Patrol, said America's most dangerous "weapon"—the automobile .—killed 40,000 people last year; 6.1 people per million miles driven—three people for every mile America's cars moved.

Trooper Eskridge pointed out that one-third of those killed on highways died in accidents at speeds under 30 miles an hour. His point: Speed doesn't kill, carelessness and thoughtlessness do.

Another point he made: It is virtually impossible to teach safety to a driver once he has a license and is behind the wheel. This also applies to men and machines in a mill, he said. The time to teach safety is before the man starts operating the machine.

41 Mills on Continent Using ClO_2 Bleach

Forty-one pulp mills on this continent are, or will be, using the chlorine dioxide process, according to Dr. W. H. Rapson, University of Toronto, who personally has been associated with installations in 37 of the 41 mills.

At the spring meeting of the Technical Section, Western branch, Canadian Pulp and Paper Assn. at Harrison Hot Springs, B.C., Dr. Rapson said 22 mills had been using chlorine dioxide for a year or more, five more were adopting that process this year and 14 more mills have plants under construction.

Dr. Rapson and Dr. Morris Wayman, technical director of Columbia Cellulose Co., Prince Rupert, developed one of the original techniques for its use at the Hawkesbury Ont. mill of Canadian International Paper Co. in 1946. Dr. Wayman, incidentally, was elected chairman of the Western Branch, succeeding Howard Graham, Elk Falls Co. First vice chairman is Dr. John Keays, Powell River Co.; second vice chairman, J. H. Shumka, MacMillan & Bloedel; secretary, Robert R. Alpen, C. C. Moore & Co.

Titanium Recommended . . .

Dr. Rapson said chlorine dioxide, which had in the past created one of the industry's major corrosion difficulties, could now be used efficiently and economically in contact with a variety of materials. He mentioned titanium as especially resistant to corrosion in chlorine dioxide applications.

Dr. J. M. Jopp, director of engineering for Columbia Cellulose Co., which has encountered numerous corrosion problems, spoke on sulfite digester linings and said steel stabilized with titanium, columbium or tantalum had been found superior under reducing conditions, with acid at about 300° F. containing SO_2, and that titanium had factors in its favor—less cost, and being an element which in itself inhibits corrosion.

W. C. R. Jones, vice president, Powell River Co., said: "In the last 25 years I have encountered some corosion fiascos. None was necessary. All displayed a lack of communication between people.

"My deeper criticism is reserved for the stupidity in installing a plant which is bound to fail, corrode, disintegrate, when this failure could have been avoided by good communication between the people affected.

Next spring's meeting will be a part of the Tri-Way meeting in Victoria, held with the Pacific Coast Superintendents and TAPPI groups. Dates are May 19-20-21 at the Empress Hotel.

Time Out for Golf . . .
L. G. (LARRY) HARRIS, manager of the Harmac pulp division, MacMillan & Bloedel (left) receives from R. H. R. YOUNG, exec. vice pres., Crown Zellerbach Canada, the J. A. Young trophy for winning the annual golf tournament of CPPA Western branch technical section.

The Powell River Award paper competition was won by J. W. Thomas, of Elk Falls Co. The International Brotherhood of Migratory Peddler's Waiting Room No. 6, headed by Doug Stinson with Sam MacKay, producer of the skits, initiated R. H. R. Young, vice president Crown Zellerbach Canada, as an honorary member.

Soderhamn Acquires Mater Sawmill Line

Soderhamn Machine Mfg. Co., Talladega, Ala., has acquired sole distributorship for Ala., Ark., Miss., Ky., La., Tenn., Tex., and Okla., of machinery manufactured by Mater Machine Works. Soderhamn will also be in position to furnish service and spare parts. The Mater equipment includes carriages, headblocks and knees, air dog conversion kits, frames, wheel trucks, setworks, log turners, saw guides and husks, trimmers, and Mater-Berry hydraulic carriage feeds for mechanization of sawmills.

TAPPI Ladies' Night Features Paper Products

"Have you used your full quota of paper products today?" This question was asked of members of Metropolitan TAPPI at their annual Ladies Night on May 7th in New York City.

Guest speaker Maurice R. Castagne, PULP & PAPER's eastern editor, said that although metropolitan paper consumption may be high (possibly a ton per person in New York City), it hasn't reached a saturation point.

To "prime the pump" to stimulate greater use of paper products, each lady was given a paper shopping bag full of paper products such as paper lace doilies, paper place mats, bath mats, guest towels; floor mops, charcoal briquets, contour-packaged in molded pulp; a paper clothesline; dusting cloths; plastic-paper-foil combination shelf paper, and "right-size, won't-slide-off-your lap," napkins.

Contributions came from The Diamond Match Co.; Royal Lace Paper Co.; Union Bag; American Cyanamid, and Kimberly-Clark.

New officers are Ed Hudson, Lowe Paper Co., chairman; Phil Talips, Morris Paper Board Co., Inc., chairman-elect and Warren Kumblad, Socony-Mobil, secretary-treasurer.

Your Life with Paper may Change the Future
(From left): MAURY CASTAGNE, Eastern Editor, PULP & PAPER; GRACE NIXON and DUDLEY NIXON (Geigy Dyestuffs). Mrs. Nixon is modeling a paper skirt and cape (courtesy of American Cyanamid Co.). Event was Annual Ladies Night of Metropolitan Section of Empire State TAPPI. Guest speaker was Mr. Castagne who had a (paper) bag full of interesting paper products which he gave to each lady present.

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Here's newest data on caustic soda handling

This new bulletin can help you handle and store liquid caustic soda safely, efficiently, and with minimum risk of iron contamination.

Its 40 pages include large, detailed diagrams of equipment; a section on materials of construction; recommendations for unloading, dilution, piping, and storage; and a section on safety precautions and first aid.

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Helpful hints for buyers

In case you haven't received a copy, here's another bulletin packed with useful information on caustic soda.

This one is edited especially for buyers. It's pocket-size for ready reference. Besides data on forms and grades of Hooker caustic soda, it includes facts on the economics of 50% *vs.* 73% liquid solutions; capacities of tank cars and other containers; and useful shipping information.

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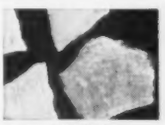
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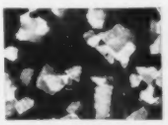
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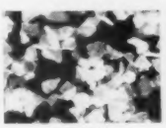
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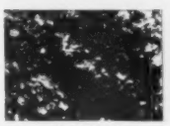
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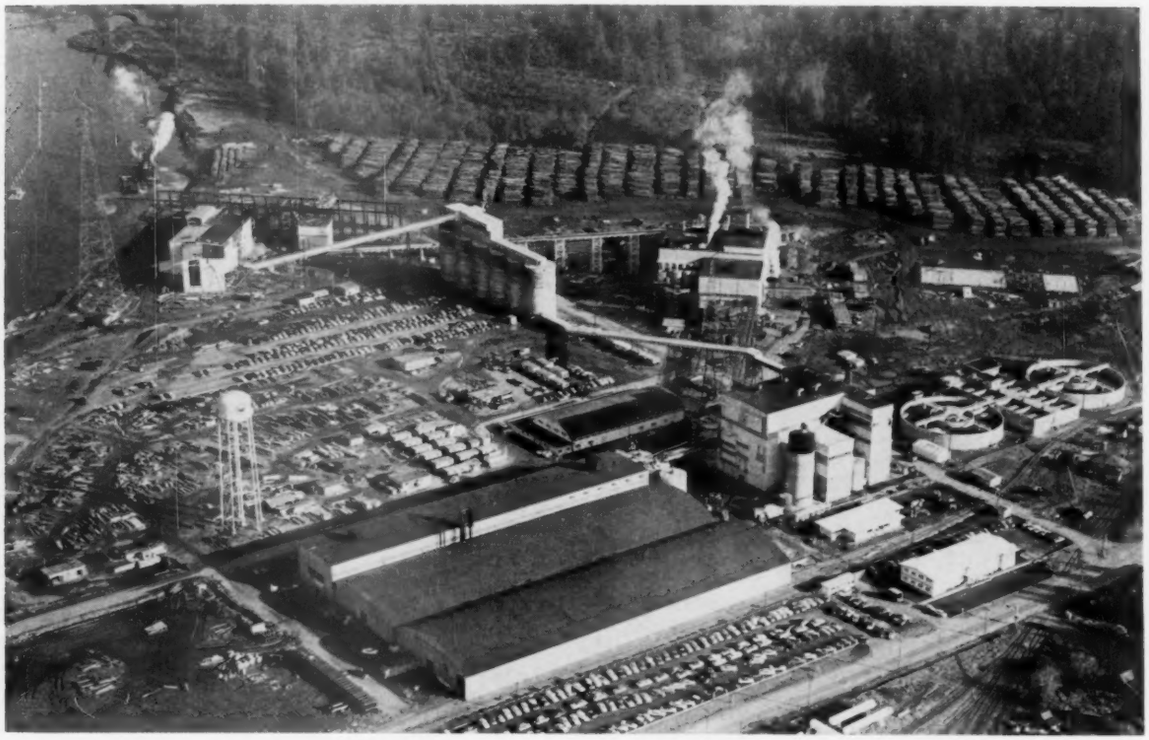

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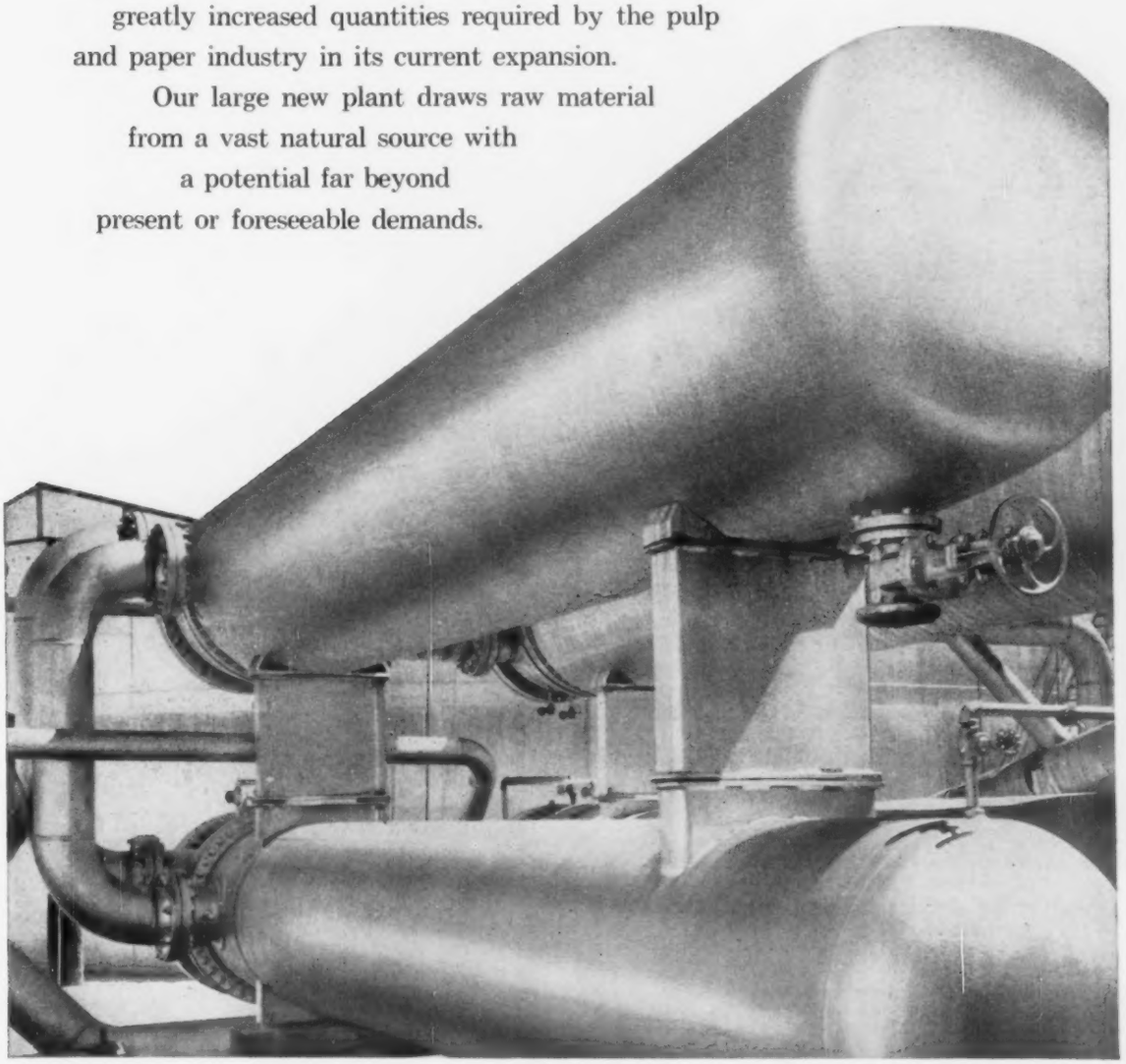

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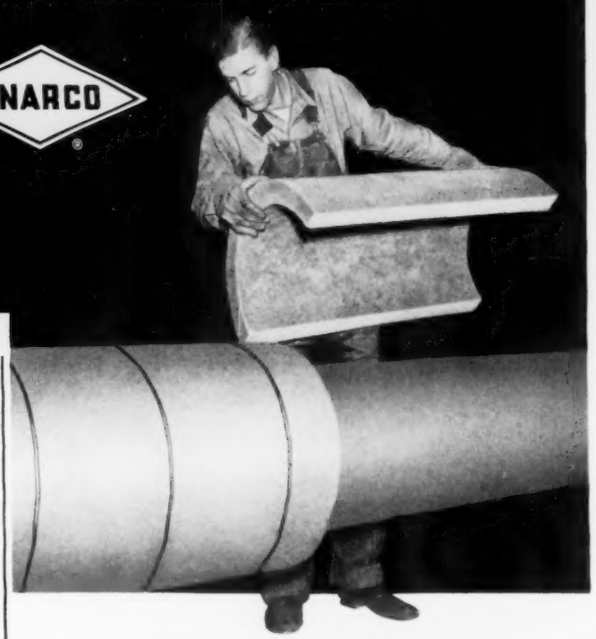

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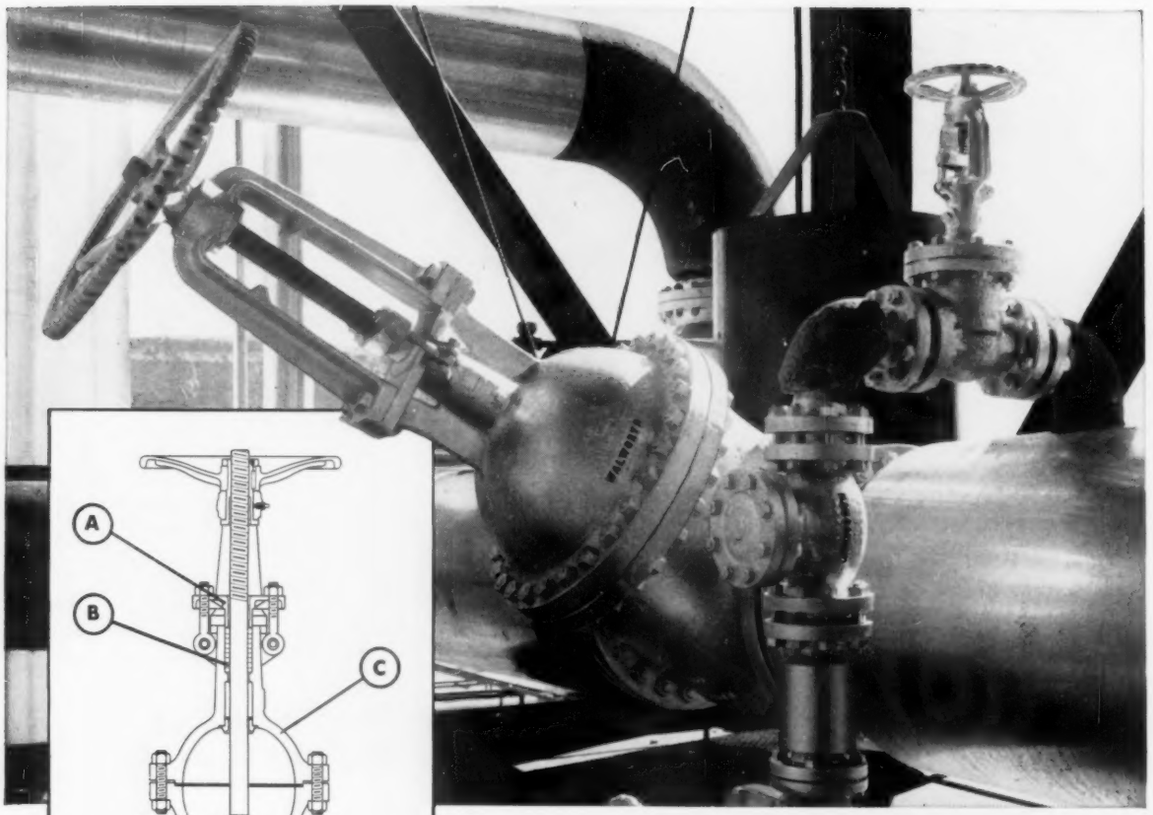

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Sulphur, often called one of the Four Pillars of the Processing Industry, is benefiting mankind in many ways. None is more important than that of controlling crop-destroying pests.

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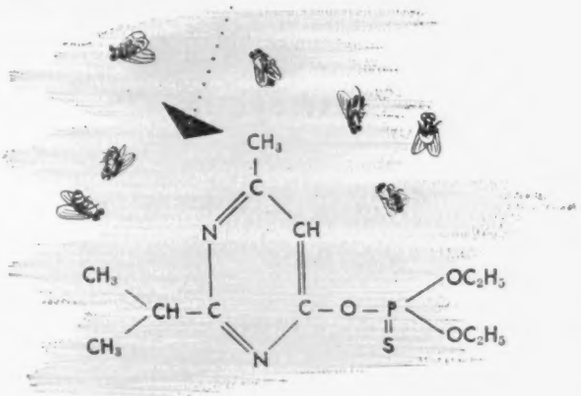
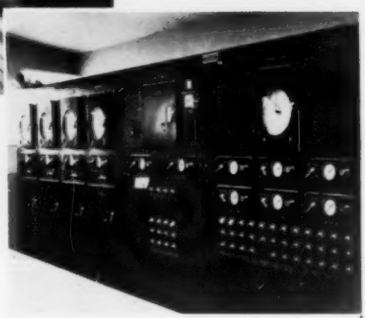


Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N.Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming



30,000,000 Gallons Daily of Highest Quality Water

Essential for the top-grade pulp Weyerhaeuser Timber Co. produces at their new 400-ton sulfite mill at Cosmopolis, Washington

. . . automatically

Flow, demand, backwashing and chemical proportioning all automatically controlled to assure lowest chemical cost and to eliminate the need for shift operators.

Specialists in Industrial Water Systems

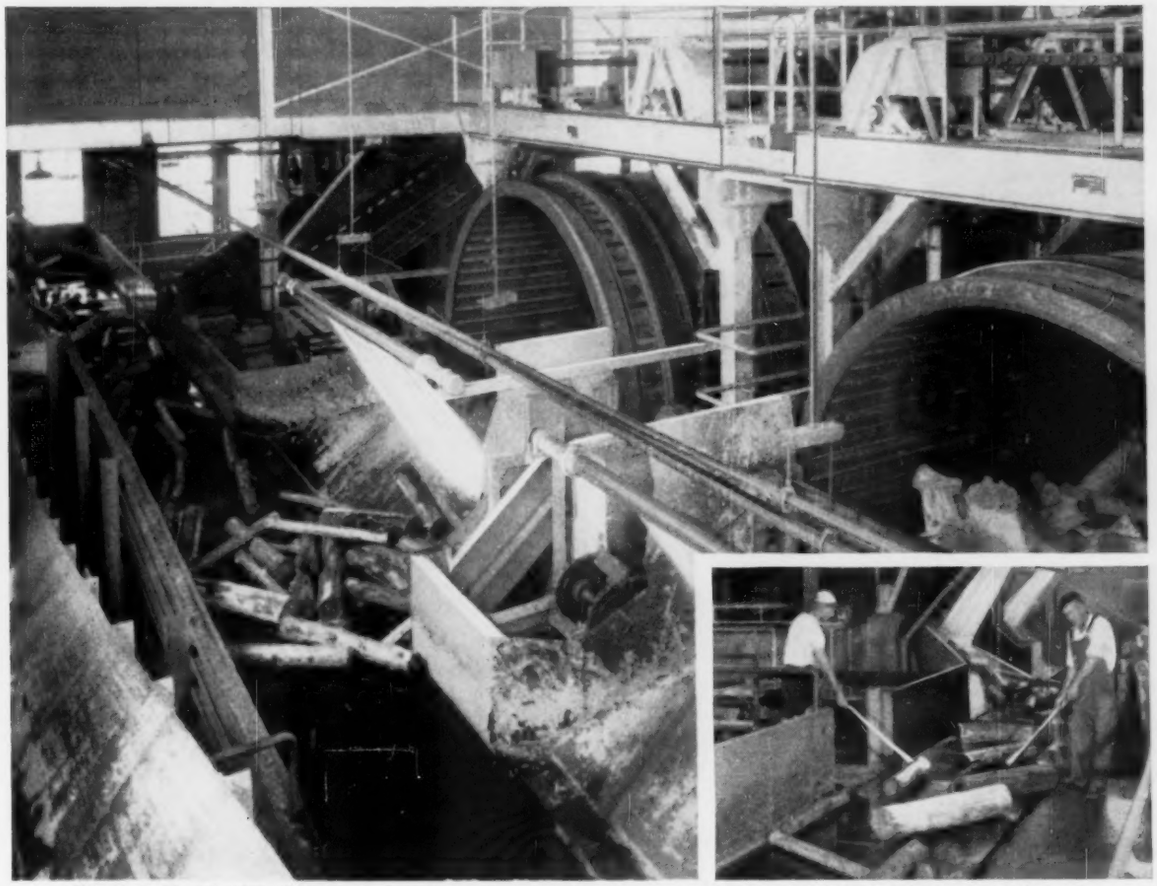
- Filter Plants
- Water Purification
- Design & Engineering

NORTHWEST FILTER COMPANY

122 Elliott Ave. W., Seattle 99, Wash. – Ph. MUrdock 7880

US RUBBER Conveyor Belts

Logging a new record!



This U. S. Giant® 60" wide Log Sorting Belt is built to withstand the heavy impact of logs tumbling onto it from the debarking drums (left) and to resist the sharp points of the pickaroons which the men use to sort out rejects (right).

When the Mosinee Paper Mill Company, Mosinee, Wisconsin, required a conveyor system to step up production of wood and pulp, they turned to the company that had helped with the same problem on many installations in the United States and Canada—U. S. Rubber.

"U. S." engineers studied the requirements, the mill layout, and—above all, the problem of costs. Eight "U. S." conveyor belts were installed, made endless on the job. Production went up to a new record for the log-sorting operation of Mosinee Mills.

The easiest and most economical way to increase haulage and to lower costs is to get in touch with factory-trained United States Rubber conveyor belt engineers. Their wide and varied experience in materials handling for the wood products industry allows them to give you the very best help obtainable.

Write or phone any of the 27 convenient "U. S." District Sales Offices or contact United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, New York.

US RUBBER Mechanical Goods Division

United States Rubber

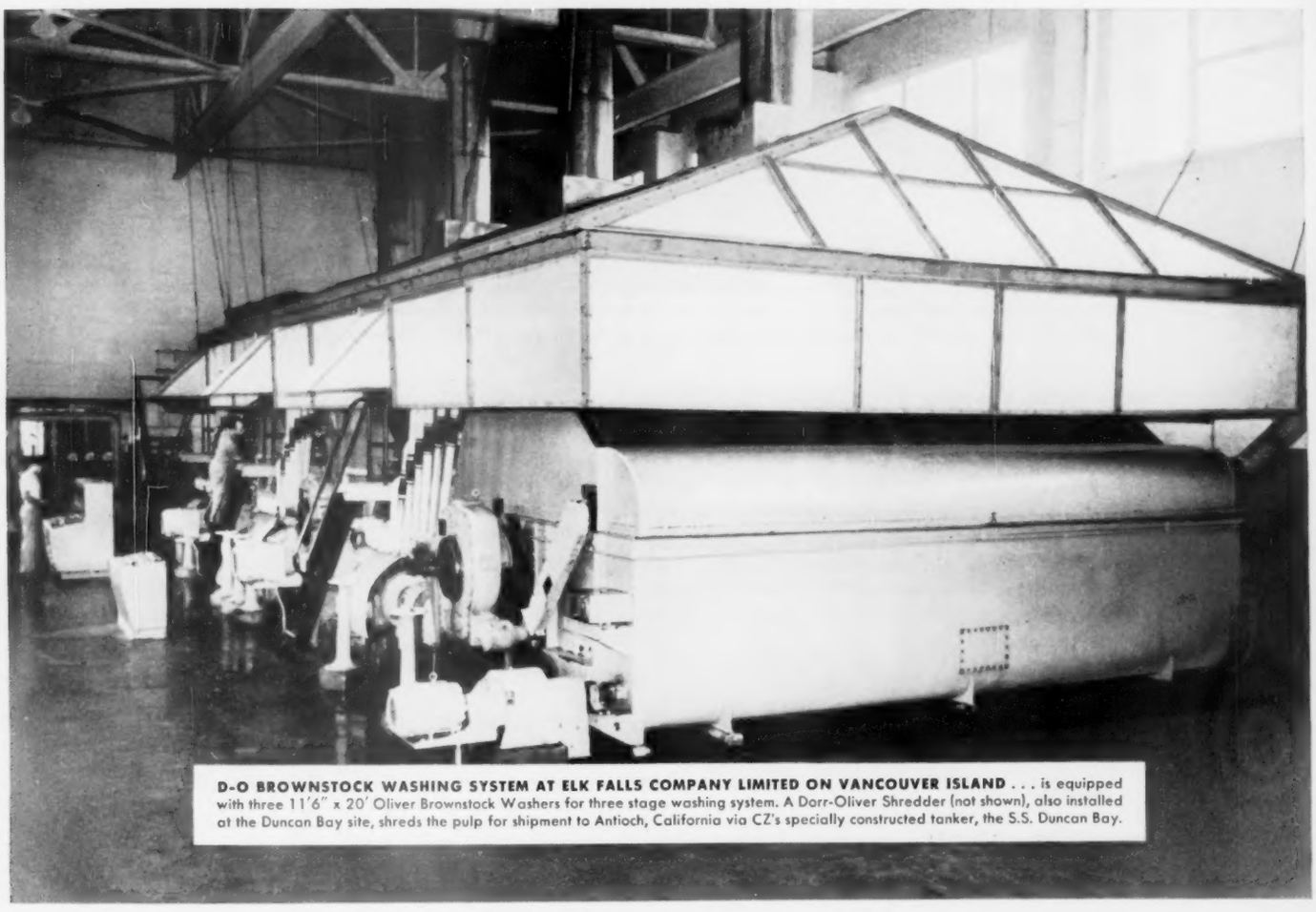
"OPERATION NOODLEPULP"

Features Dorr-Oliver Equipment in Six Major Roles

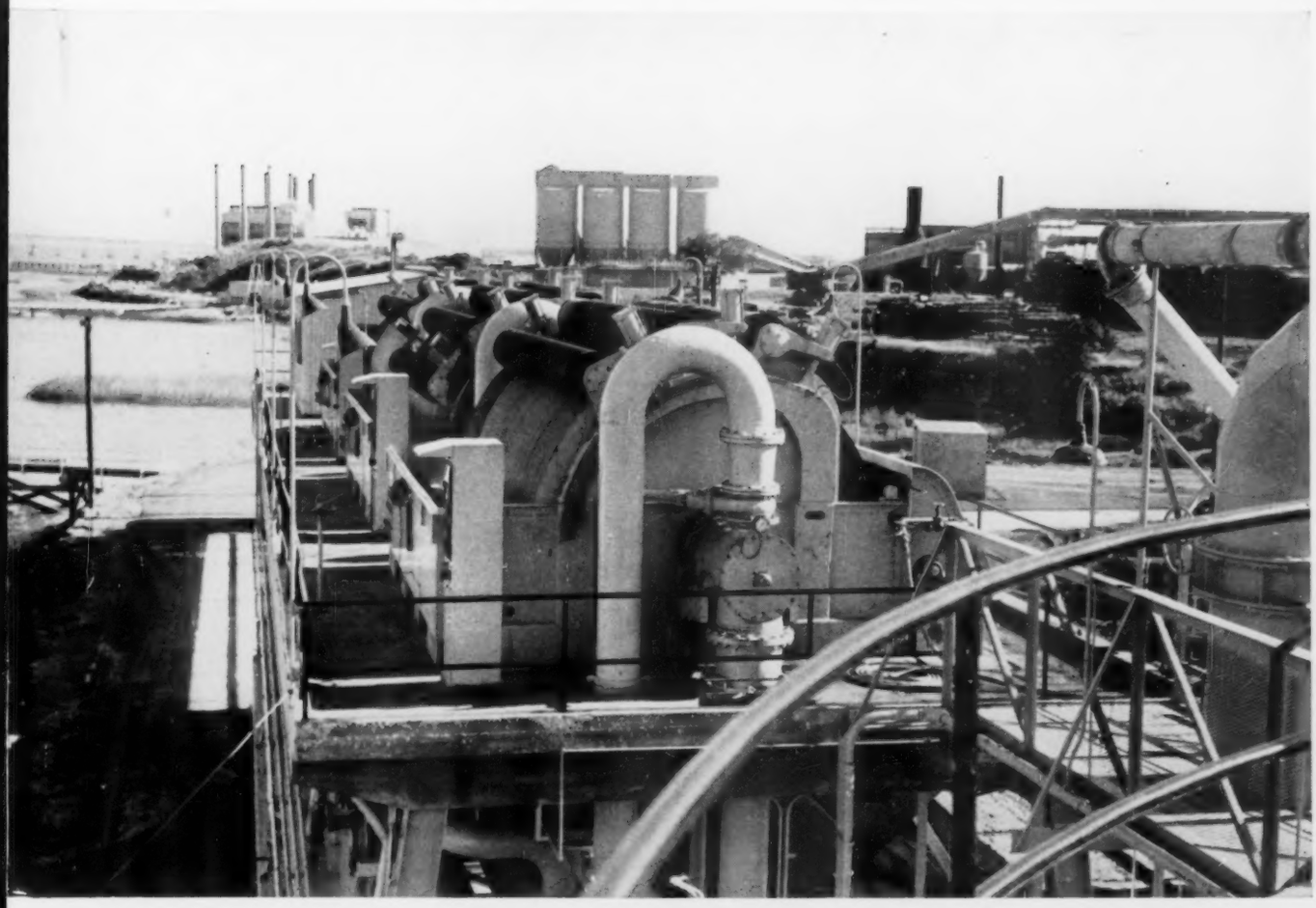
From Duncan Bay, British Columbia to Antioch, California, the significance of Dorr-Oliver's contribution to "Operation Noodle Pulp" lies in diversification and performance.

At the Elk Falls Company Limited on Vancouver Island, a Dorr-Oliver Brownstock Washing System processes pulp from Canadian forests. From the Elk Falls Co. Ltd. at Duncan Bay, B.C. the pulp is shipped via a special tanker to Antioch, Calif., where D-O Thickeners, Valveless Deckers, Ahlfors Screens, an Oliver Saveall, and a Clariflocculator have been installed in Crown Zellerbach's new 400 TPD facilities.

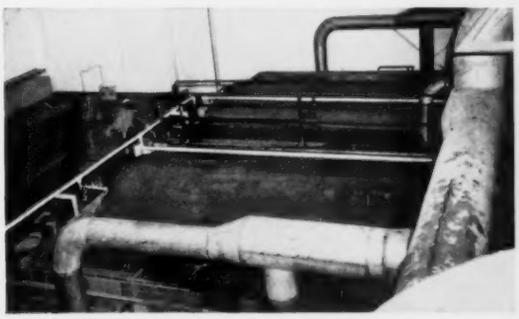
For more information on the complete line of Dorr-Oliver equipment and services for the pulp and paper industry write Dorr-Oliver Incorporated, Stamford, Connecticut.



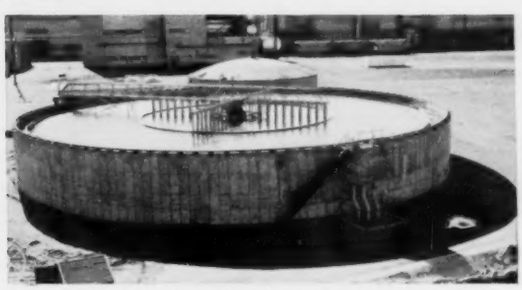
D-O BROWNSTOCK WASHING SYSTEM AT ELK FALLS COMPANY LIMITED ON VANCOUVER ISLAND . . . is equipped with three 11'6" x 20' Oliver Brownstock Washers for three stage washing system. A Dorr-Oliver Shredder (not shown), also installed at the Duncan Bay site, shreds the pulp for shipment to Antioch, California via CZ's specially constructed tanker, the S.S. Duncan Bay.



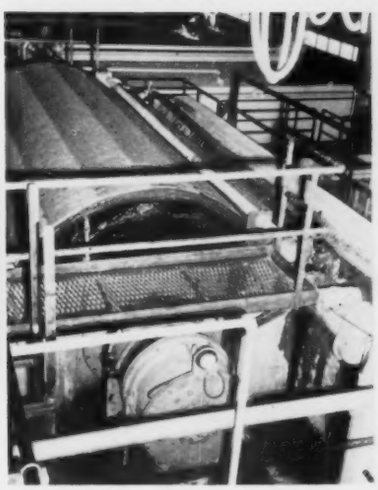
OLIVER HIGH-DENSITY THICKENERS ON THE DOCK AT ANTIOCH, CALIFORNIA . . . thicken the diluted stock pumped from the S. S. Duncan Bay to 25% consistency. Stock from these big (11'6" x 16') Thickeners is then carried to storage areas by conveyor belt and a large stacker.



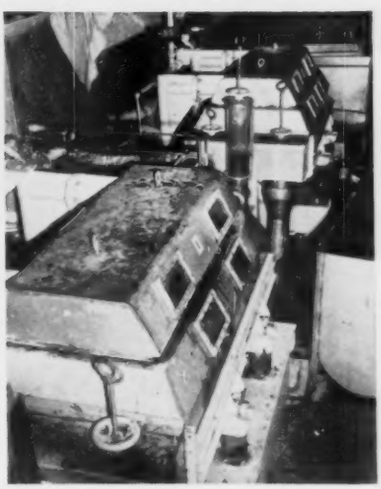
OLIVER DECKERS IN FIRST PROCESSING STEP INSIDE MILL . . . after screening stock is thickened on two Oliver 9'6" face x 16' valveless Deckers. A 24" D-O repulper conveyor is installed between the two Deckers.



DORR 120' DIA. CLARIFLOCCULATOR PROCESSES 10 MGD OF SAN JOAQUIN RIVER WATER . . . for pulp handling purposes. Chemical additives to facilitate treatment are alum and silicate.



DORR-OLIVER SAVEALL RECLAIMS FIBRES FROM PAPER MACHINE WHITE WATER . . . this 8' x 16' Oliver Vacuum Saveall, with a rubber-covered cylinder, is installed at wet end of West's second largest machine.



D-O AHLFORS SCREENS PROCESS REFINED SCREENINGS . . . these Upflow Vibrating Pulp Screens, 24 sq. ft. models, are used as part of a rescreening from primary screens.

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INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Use **d-i LESTOIL**
LIQUID DETERGENT
For

a short cut to BETTER PAPER

You will whittle down costs when you cut the waste out of your raw stock.

Now, the lowest grade furnish can be used for high quality paper! Even the least expensive stock that has been thoroughly cleansed with d-i LESTOIL results in perfectly finished paper . . . Yes, with d-i LESTOIL you can cut down the cost of raw stock and reap the profits of fine paper.

USE d-i LESTOIL IN THE KIER BOILER . . . to cleanse rags, cotton linters and cotton mill sweeps of grease, oil, wax and all types of impurities and soil.

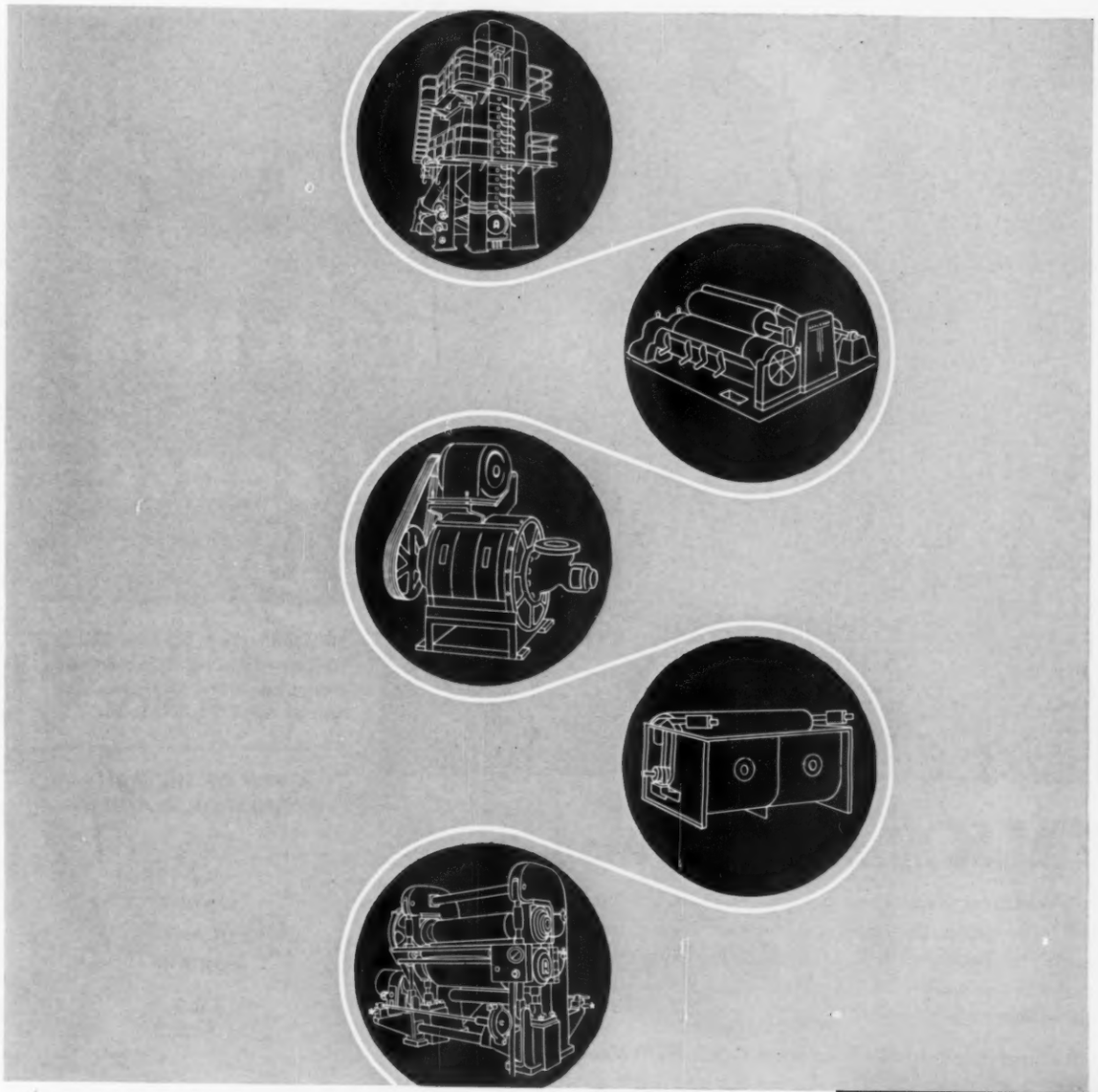
USE d-i LESTOIL IN THE PULPER OR BEATER . . . to de-ink newsprint, magazine and ledger stock . . . to emulsify and disperse wax, grease, oil, asphalt, adhesives, coatings and fillers from mixed papers . . . to defibre quickly and more thoroughly.

USE d-i LESTOIL . . . to prevent formation of insolubles in kier boilers . . . to keep soil from adhering to washers, wires and felts, and to prevent shut-down time in cleaning the system.

USE d-i LESTOIL . . . to launder perfectly (on or off the machine) all types of felts . . . lengthen felt life and use . . . to maintain desired texture.

For complete technical information and generous free sample write to:

ADELL *Chemical Co.*
HOLYOKE, MASSACHUSETTS



knowing and filling the needs
of the paper industry

APPLETON MACHINE COMPANY

Appleton, Wisconsin

Supercalenders, winders, rotary screens and gravity deckers, textile calenders, machine calenders, calender rolls, Cram Dryer Drainage System.

SIX SIZES—½ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

FALK ALL-STEEL Shaft Mounted Drives

Wherever you require a highly efficient, economical speed reducing unit to fit into a limited space, the FALK All-Steel Shaft Mounted Drive meets your needs perfectly. This rugged, compact reducer mounts directly on the driven shaft and is driven through V-belt or chain drive from any convenient rotating power source.

It's hard to match the versatility of a Falk Shaft Mounted Drive. You can choose a single or double reduction unit and use it with any of the many possible sheave or sprocket ratios to obtain almost any specified speed between 420 and 10 rpm. Equally important, the standard Falk Shaft Mounted Drive is available for horizontal and vertical application. Delivery is immediate, installation is quick and easy.

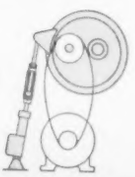
These units are completely FALK-designed and FALK-built for a long life of dependable, trouble-free service. *Precision-cut helical gears of highest efficiency* are employed for efficient, quiet operation.

Always available promptly from factory and distributor stocks, from *coast to coast*. For details, ask your Falk Representative or Distributor—or write for **Bulletin 7101.**

A FEW OF THE MANY APPLICATION FEATURES

VARIABLE SPEEDS through use of variable-pitch sheaves—automatic belt adjustment with tie-rod adjustment

OVERLOAD RELEASE that will slacken belts and cut off power if overload occurs



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Manufacturers of

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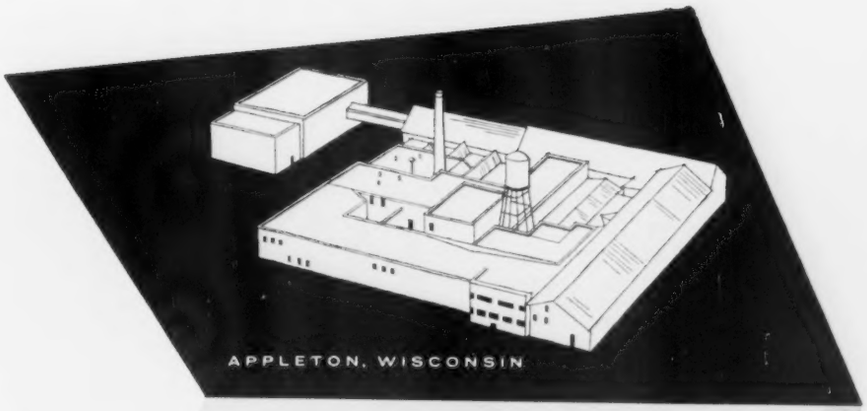
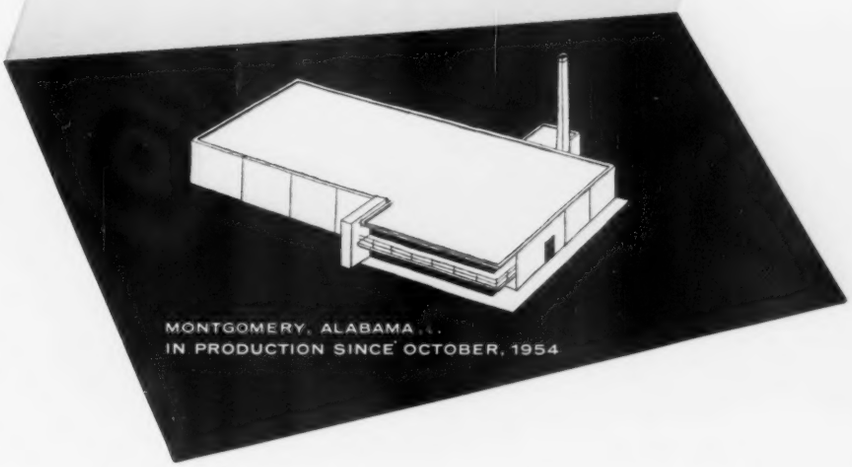
FALK
...a good name in industry



APPLETON, WISCONSIN

Confidence....in the paper industry

Foresight.....to anticipate changing conditions and requirements of the paper industry with new manufacturing facilities

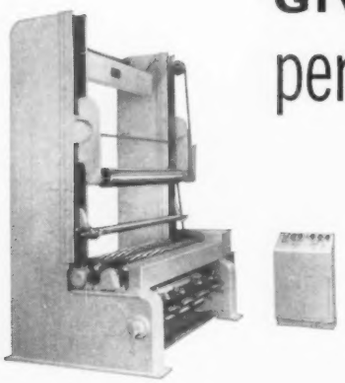


MONTGOMERY, ALABAMA...
IN PRODUCTION SINCE OCTOBER, 1954

Appleton Wires are Good Wires

Appleton Wire Works, Inc.
GENERAL OFFICES, APPLETON, WISCONSIN

GIVE YOUR CUSTOMERS
perfect rolls on every order

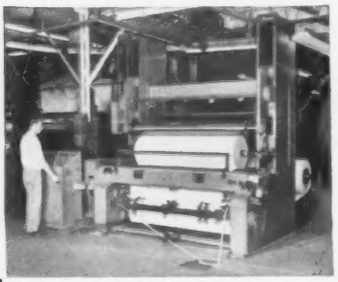


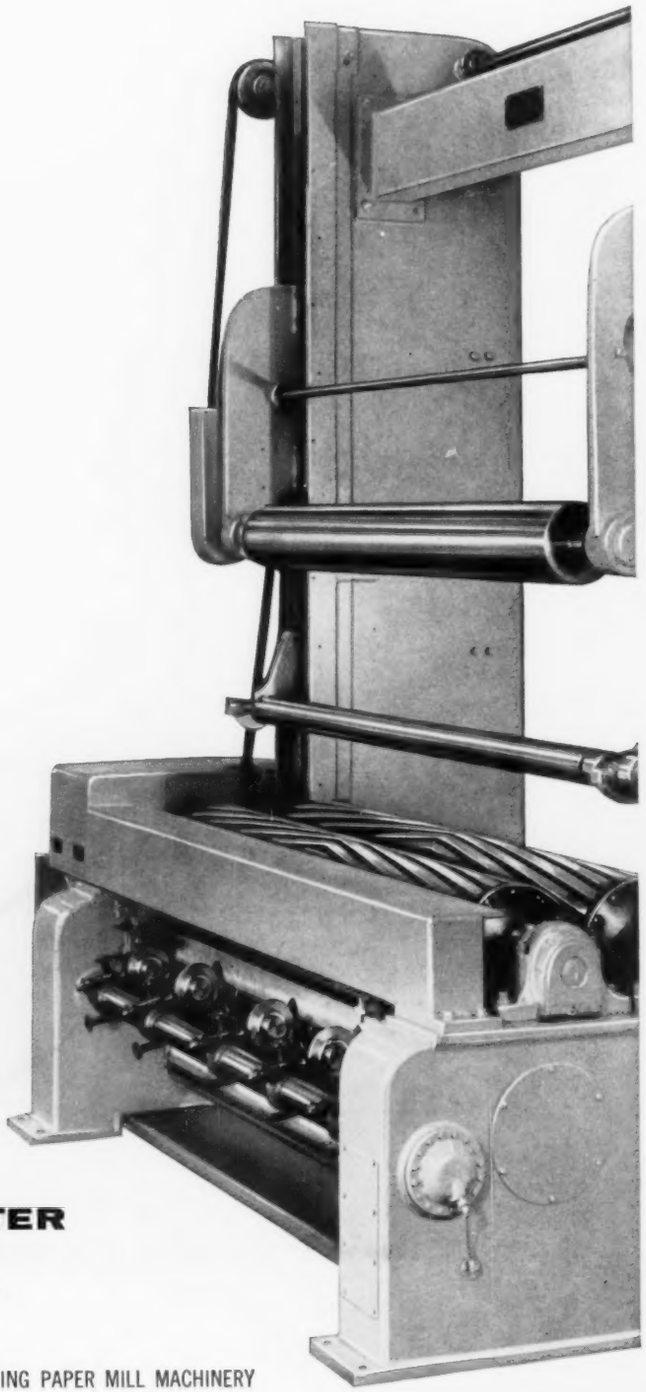
Mills equipped with Manchester Winders and Slitters report uniformly wound straight rolls accurately slit with clean edges on every run.

This means they can meet the most exacting printing specifications with a plus value of lower labor and operating costs. Best of all, customers are satisfied and show it with repeat orders.

The Manchester Winder and Slitter is easily operated from a single control station. Air-control insures uniform tightness at proper tension over the entire roll diameter.

Get all the facts. Write us today.





THE MANCHESTER MACHINE CO.
MIDDLETOWN, OHIO

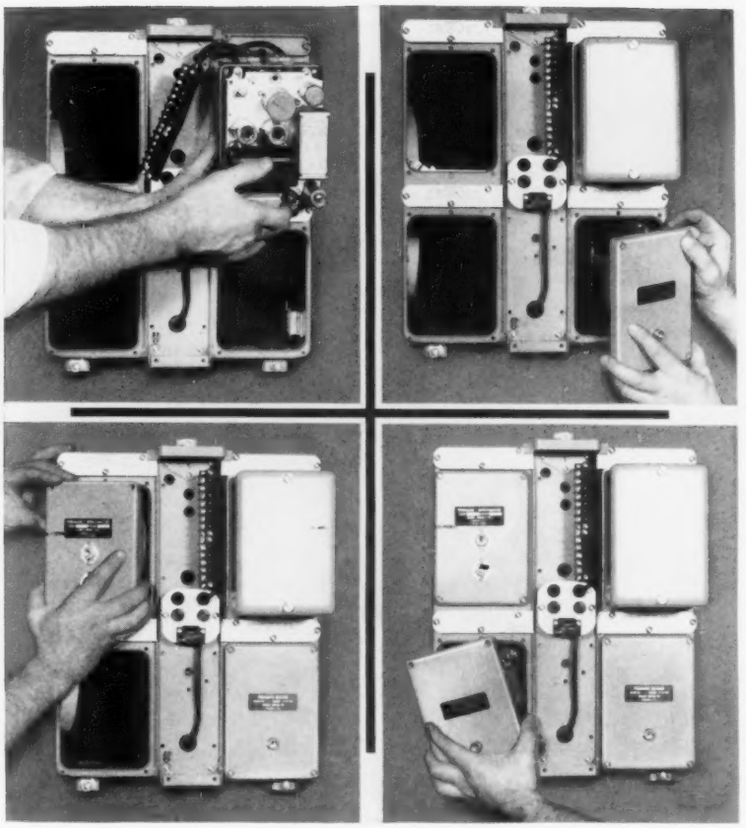
SPECIALISTS IN DESIGNING AND BUILDING PAPER MILL MACHINERY

Only the Best goes into Puget Pulp

Technical skill is as much an ingredient in fine pulp as fibres or chemicals. Only the highest skills and most experienced technicians have a hand in the manufacture of Puget Pulp.
That's one of many reasons why converters prefer the superior attributes of Puget Pulp.

PUGET SOUND
PULP AND TIMBER CO.
BELLINGHAM, WASHINGTON

CUSTOM BUILD your own Bailey Recorder



These four views of the back of a Bailey Recorder show how four plug-in units may be added as needed to meet almost any recorder application.

The freedom and flexibility of "do-it-yourself" instrumentation is yours in the Bailey Recorder. A variety of plug-in units make it possible to record, control, and retransmit any variable that can be converted to a pneumatic or electric signal.

The basic plug-in units are the Bailey a-c and d-c Electronic Receivers and Pneumatic Receivers. Any four of these may be used in one recorder, intermixed in any way, to provide four continuous records on one chart.

For automatic control, other plug-in units are available.

For square root extraction or linear integration, there are two plug-in variations of the Bailey Integrator.

When you want a pneumatic signal that varies according to a pre-set pattern plug in a Bailey Program Controller.

Periodic running time of a condition or process is recorded on the chart when a Bailey Running Time Recorder is used.

These and other plug-in units are described in Product Specification E12-5. Some companies stock Bailey Recorder cases and assorted plug-in units. As instrumentation and control needs arise they build up the kind of recorder-controller required, using the proper plug-in units from stock. Unmatched versatility such as this means lower instrumentation costs.

For the complete story of how easily you can custom build this recorder to your needs, see your Bailey Engineer. G43-1

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Instruments and controls for power and process

BAILEY METER COMPANY

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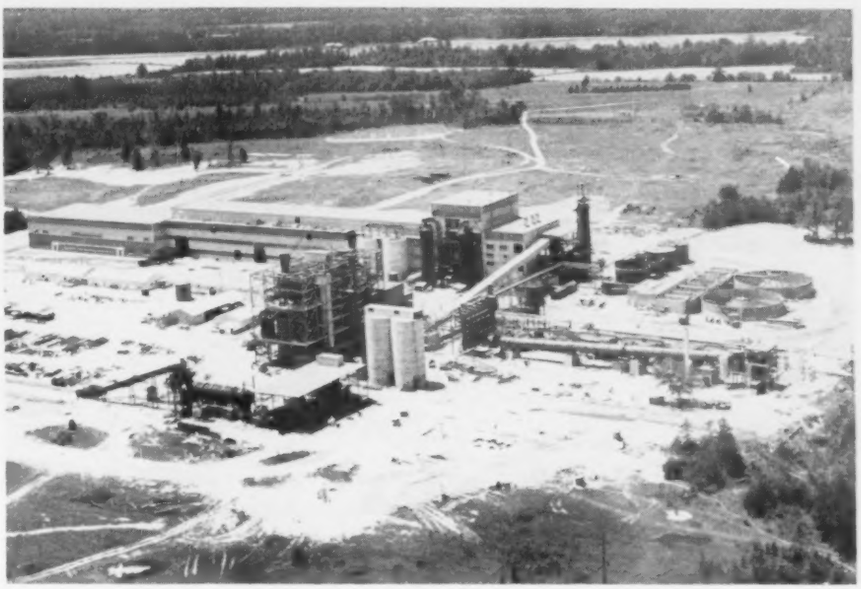
E·Z·PULP



NEW 300 TON PER DAY MARKET PULP MILL—DEMOPOLIS, ALABAMA

This mill is located on the Tombigbee River with year-round navigation available to Mobile and other ports. Two major railroad systems provide dependable service to all parts of the country.

The latest design of process and equipment permit close control by skilled craftsmen to produce both softwood and hardwood bleached sulphate pulps. Ample water and exceptionally fine timber reserves provide a dependable source for a uniform quality pulp.

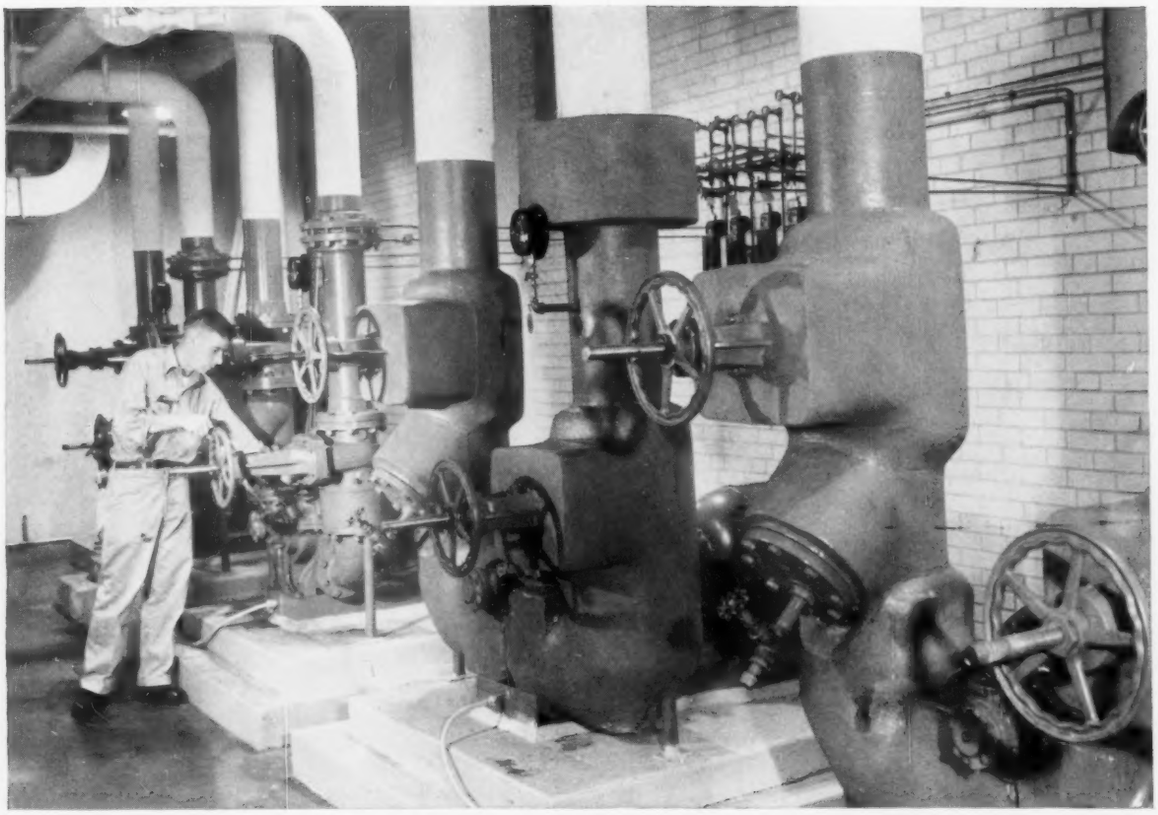
E-Z PULP will meet your most exacting requirements for color, cleanliness, opacity and strength.

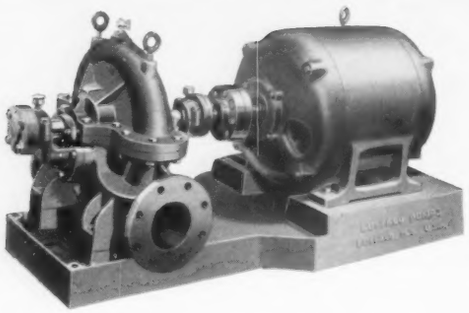
For full information write E-Z PULP SALES DIVISION, Department E, Box 491, Tuscaloosa, Alabama.

HARDWOOD SOFTWOOD

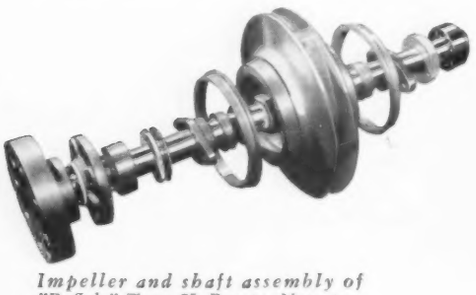
Gulf States Paper CORPORATION

E-Z PULP SALES DIVISION, TUSCALOOSA, ALABAMA





"Buffalo" Type SL Double Suction Pump, industry's choice for clear water service in capacities from 10 to 14,000 gallons per minute.



Impeller and shaft assembly of "Buffalo" Type SL Pumps. Note precision ball bearings, husky shaft, wearing rings and efficient enclosed impeller.

FOR PERMANENT PUMPING EFFICIENCY

Don't Leave Out the "Q" Factor*

"Buffalo" PUMPS like the Type SL Double Suction Pumps above, handling chilled water in a large plant, *assure* this permanent efficiency! Their design and construction go far beyond "good enough". Their ample water passages and well designed impellers — providing smooth hydraulic balance and efficiency — reflect the high standard of engineering, foundry and machining craftsmanship developed in our 80 years of building pumps. We call this standard the "Q" Factor*, and it's the reason behind the permanent pumping efficiency enjoyed by owners of "Buffalo" Pumps everywhere. Write for Bulletin 955 and see why you save by specifying the best!

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO PUMPS

Division of Buffalo Forge Co.

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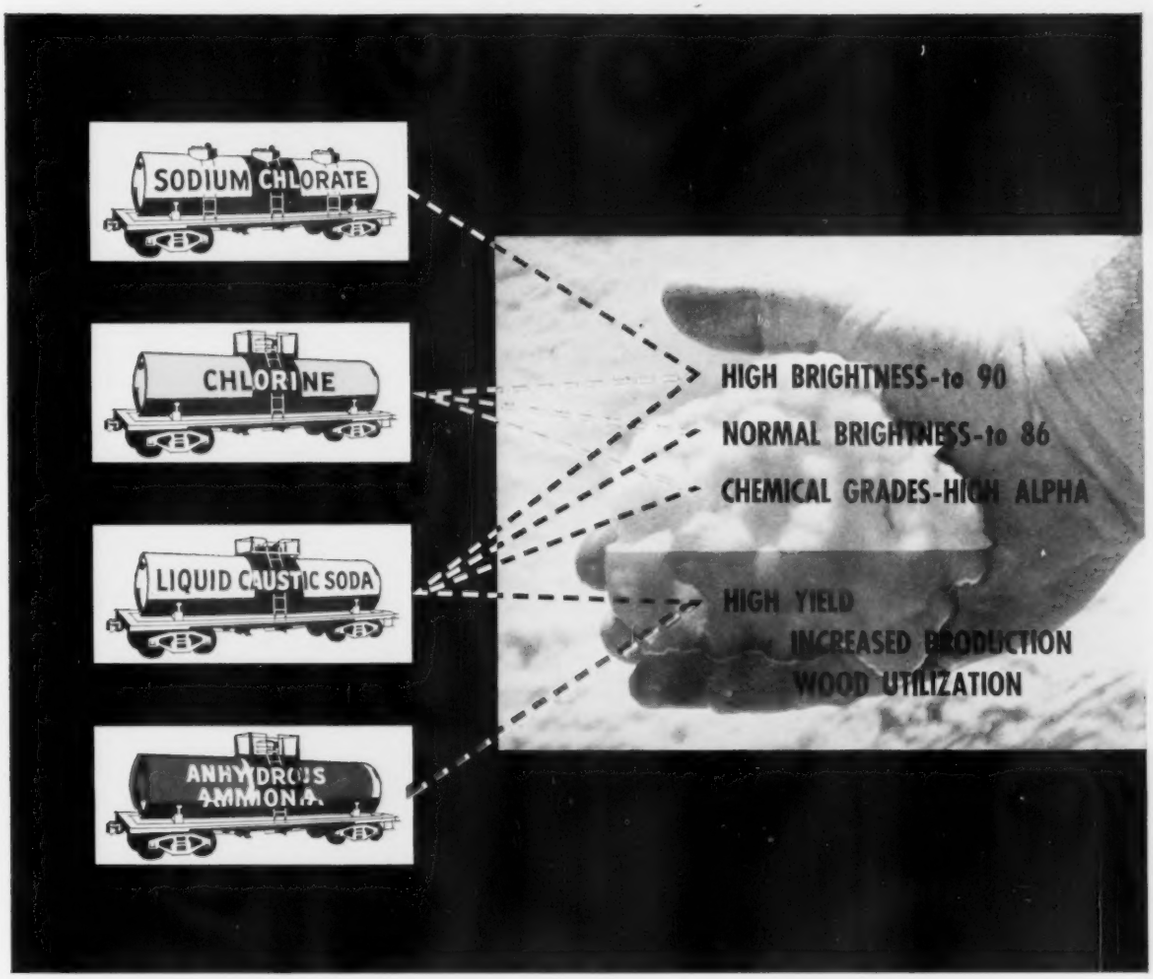
Canada Pumps, Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID



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Nearby PENNSALT Plants mean . . .

Economy in Transportation

Dependable Supply

Prompt Delivery

Reduction of Inventory Requirements

PENNSALT PLUS VALUES. Two PENNSALT plants in the Pacific Northwest not only provide quality controlled basic chemicals to the pulp and paper industries and to many other users, but also make available Technical Service. PENNSALT experienced engineers provide an *extra service* in assisting engineering of new plants and constant consultation on operational problems. Put a PENNSALT Technical Engineer on your staff, "but not on your payroll". Write for technical bulletins.

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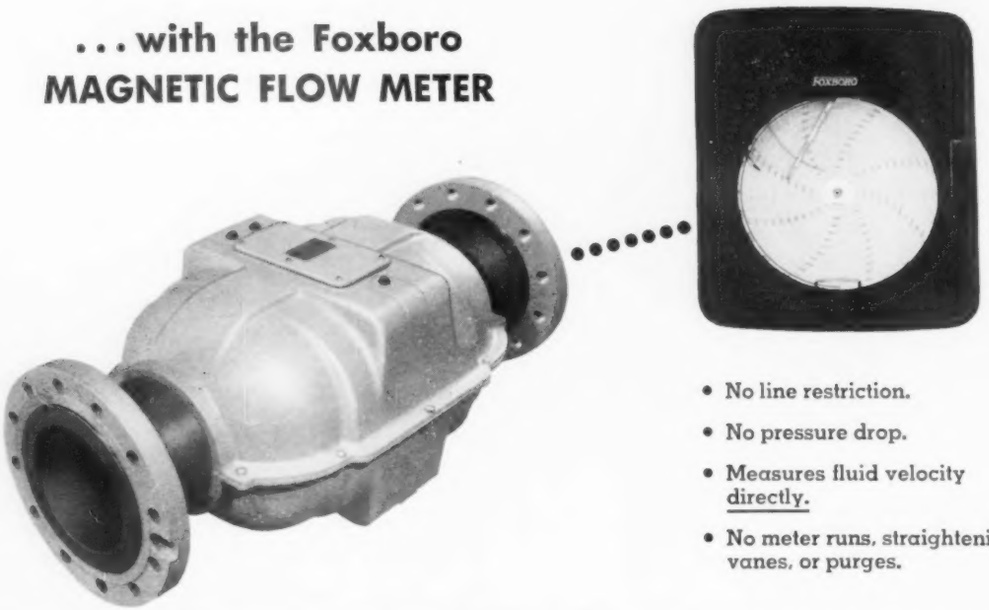
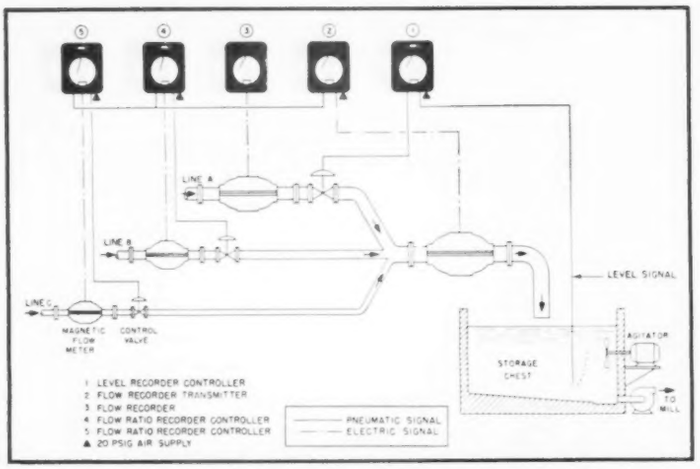
Pennsalt Chemicals

NOW! Continuous Pulp Stock Blending

. . . with the Foxboro MAGNETIC FLOW METER



- No line restriction.
- No pressure drop.
- Measures fluid velocity directly.
- No meter runs, straightening vanes, or purges.



Stocks ratioed to each other or to total flow

Above is a typical application of the Foxboro pulp stock blending system, in which each stock flow is ratioed to total flow. However, lines B and C can be ratioed to the major furnish, line A, if desired. In either case, pulp stock flows in line B and C are controlled with ratio controllers 4 and 5. Ratios are set on the controller dials. Line A then automatically supplies balance of the pulp stock required to maintain constant level in storage chest. Any ratio easily altered by changing dial setting on proper ratio controller.

Here at last is a problem-free method for continuous pulp stock blending. Based on the Foxboro Magnetic Flow Meter, this system has no line restrictions or pressure taps — nothing to foul or plug up — nothing to interfere with sustained accuracy of flow measurement.

Centralized control of any number of pulp stocks. One man easily controls the entire blending operation by the simple adjustment of ratio dials. And he can easily vary the blend *at any time* merely by changing the settings.

Precise blending — Final blend of the exact proportions desired is assured with this advanced automatic system. Batch stock tanks are eliminated; greater output is achieved.

Details on this newest application of the Foxboro Magnetic Flow Meter will be gladly furnished by your nearby Foxboro Field Engineer. Or write **The Foxboro Company, 997 Neponset Avenue, Foxboro, Mass., U.S.A.**

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First in FLOW METERING

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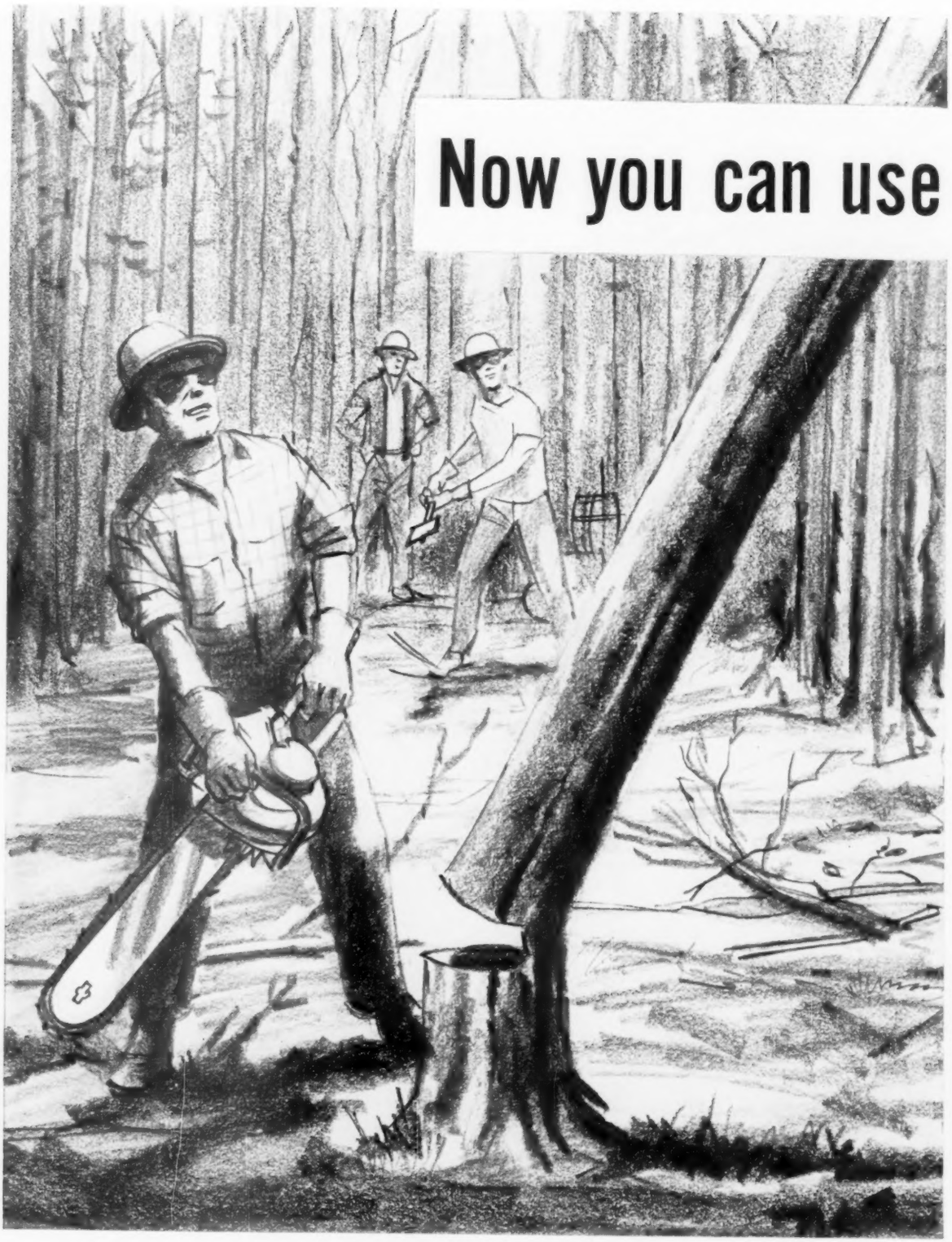
In New England—CARTER RICE STORRS & BEMENT



FIRST WITH PROCESSES AND SERVICES

your HARDWOODS to make groundwood-type pulp

. . . and bleaching these pulps with Du Pont Peroxides can give them brightness levels in the range of 70-75 G.E.

Recently several mills started commercial operation of a process to produce pulp by the defiberation of hardwood chips. This new method can also be used for the production of pulp from softwood chips and for the utilization of saw mill wastes.

Early in the development of this process advancement, Du Pont carried out extensive laboratory and field tests to determine the bleachability of these new pulps. It was found that most hardwood species can be bleached to a brightness range of 70-75 G.E. with the use of peroxide alone or a hypochlorite treatment followed by peroxide bleaching. As would be expected, bleaching with peroxide produced a pulp with high color stability.

We invite you to use Du Pont's bleaching experience with these new groundwood-type pulps. Just contact our nearest technical representative and he will be glad to assist you. He can arrange for a thorough bleaching evaluation of your pulp in our laboratory or in your plant.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Peroxygen Products Division
Wilmington 98, Delaware

DU PONT PEROXIDES

ALBONE® hydrogen peroxide

SOLOZONE® sodium peroxide

MIDWEST AREA
Call P. E. Kiefer
Chicago, INdependence 3-7250

NEW YORK & BOSTON AREA
Call C. R. Lombard
New York, LOngacre 3-6440

WEST COAST AREA
Call L. W. Blight
Portland, CApitol 7-1281

SOUTHERN AREA
Call
Charlotte, FRanklin 5-5561

FOR PEROXIDE BLEACHING

ELECTROCHEMICALS DEPARTMENT

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Making the best defoamer is not enough...

It has to be the best for YOU

Every paper mill must control foam—with the greatest possible efficiency—at the lowest possible cost. And since each mill differs so widely from every other mill, Nopco's Paper Division spares no effort to make certain we have a defoamer—whether paste, liquid, or flake—that will effectively, economically control foam in *your* mill.

But making the best defoamers is not enough. Nopco's technical staff has the breadth of experience that can be invaluable to you in fitting the right defoamer to your special needs. These men will work with you in your own mill, examine samples of white water from your mill in our laboratories, or do both.

You can't be sure you've attained *maximum defoaming efficiency at the lowest cost per ton* until you have the best "team" in the business, the Nopco technicians, prescribe from the widest range of defoamers in the business—the Nopco defoamers. Write today for a free booklet on Nopco defoamers. Nopco Chemical Company, Harrison, New Jersey.

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Canada

The Younger Generation

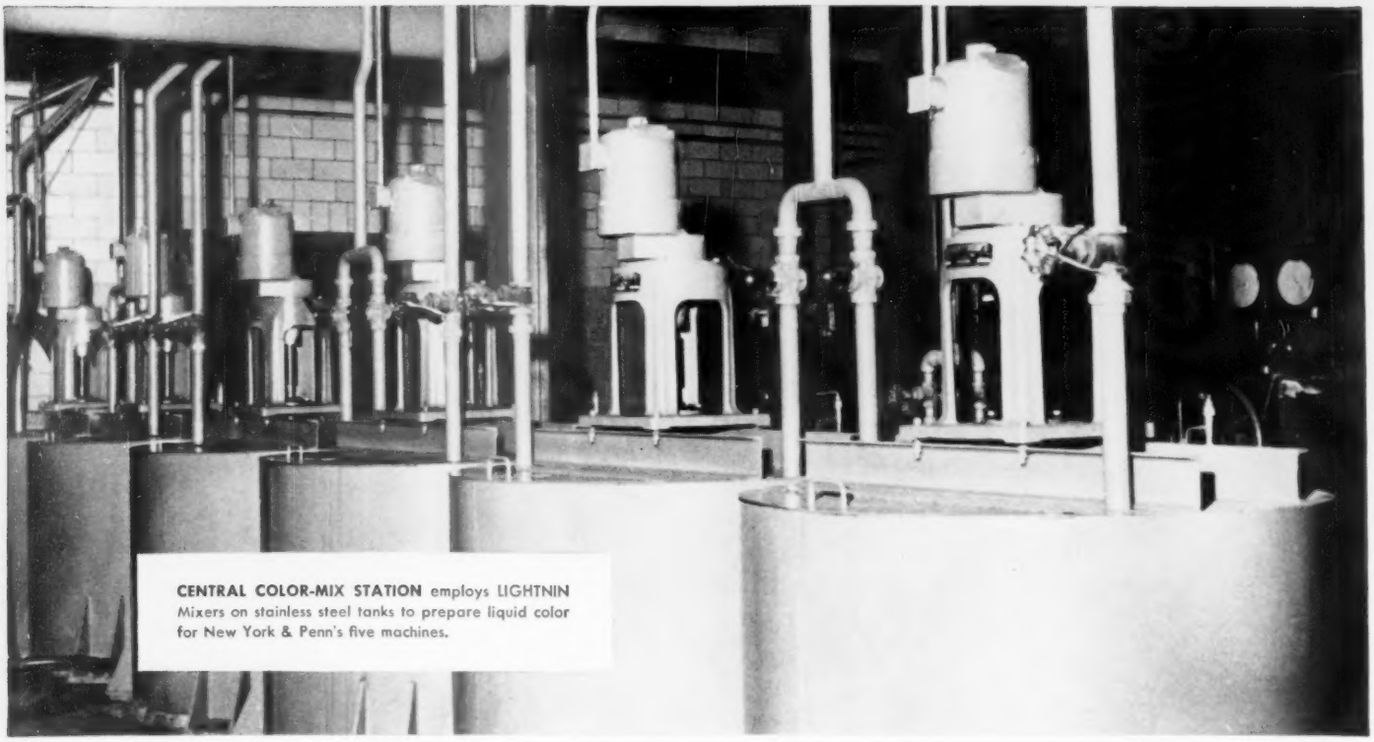
This plane is chasing time—not bears. It is reseeding cut-over areas to grow trees for harvesting when this cub's grandchildren will be playing among them.

Weyerhaeuser replenishes cut-over areas by aerial seeding, hand planting or the "natural" method—leaving a block of mature seed trees on or near the site. Aerial seeding is particularly advantageous when seasonal factors require speed or where hand planting is impractical.

Advanced forestry techniques of this kind guarantee a continuing supply of Weyerhaeuser pulp for years to come.

PULP DIVISION

WEYERHAEUSER



CENTRAL COLOR-MIX STATION employs LIGHTNIN Mixers on stainless steel tanks to prepare liquid color for New York & Penn's five machines.

How New York and Penn mixes color and size for **biggest automated stock system**

Mixing additives is a crucial phase of stock preparation at the Johnsonburg, Pennsylvania, mill of New York and Penn.

Reported the largest of its kind, this mill's new $1.2 million stock system is highly automated. It delivers several types of stock, under precise control from one central panel, to five paper machines producing an average daily output of 250 tons, with far larger built-in future capacity.

3 mixing jobs—1 supplier

Of the many fluid mixing operations in this system, the main common denominator is uniformity. New York and Penn satisfies these widely different mixing needs—*all with* LIGHTNIN *Mixers:*

1. Color for the entire five-machine system is brought to uniformity rapidly in a battery of six 100-inch-deep stainless steel tanks equipped with propeller-type LIGHTNINS.

2. Starch is cooked in one 3,600-gal. tank heated by direct steam from two jets. A turbine-type LIGHTNIN Mixer keeps the viscous starch moving to prevent burning during the one-hour cook; provides high heat transfer efficiency right up to the bursting point; then holds starch uniform until it is ready for use.

3. Clay and starch for coatings are mixed to uniformity in a 4,630-gal. tank adjacent to the starch cooking tank. A LIGHTNIN turbine-type mixer gives thorough, intimate blending of the heavy slurry averaging 25-30% solids content, and holds the coatings at full uniformity. Both turbine-type units at New York and Penn are equipped with change gears, so mixing speed can be altered if process requirements make it necessary.

What do you want to mix?

You can meet *any* fluid mixing need—from a laboratory test unit up through a 100-ton stock chest—with LIGHTNIN Mixers. You get *guaranteed,* fully predictable results . . . *standard* mixer construction that saves money if you ever need replacement parts . . . fast, competent service conveniently nearby.

For information on fluid mixing that matches your requirements, call in your LIGHTNIN Mixer representative (listed in Thomas' Register). Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

STARCH COOKS EVENLY, can't burn, in 3,600-gal. tank equipped with turbine-type LIGHTNIN. A similar unit mixes starch and clay for coatings.

FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- ☐ Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP (B-102)
- ☐ Top entering; propeller types: ¼ to 3 HP
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Condensed catalog showing all types (B-109)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
- ☐ Data sheet for figuring general mixer requirements (B-107)
- ☐ Paper stock mixing data sheet
- ☐ Portable: ⅛ to 3 HP (B-108)

Check, clip, and mail with your name, title, company address to:

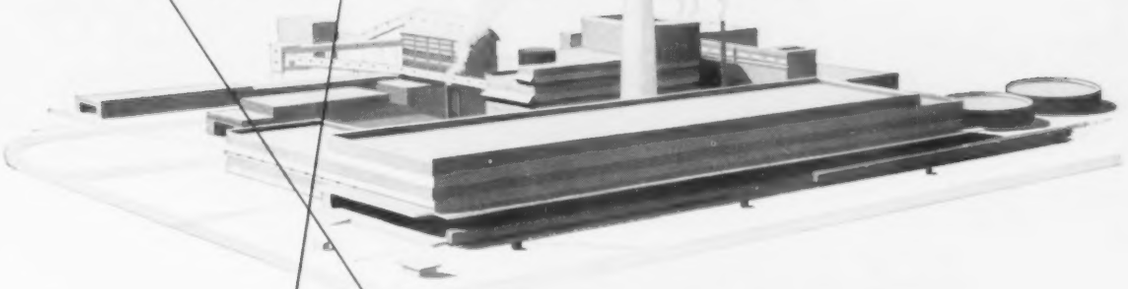
MIXING EQUIPMENT Co., Inc., 141-g Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 10, Ont.

TRONA® *serves the Pulp Industry with*

2 QUALITY PRODUCTS

from **2 DEPENDABLE SOURCES**



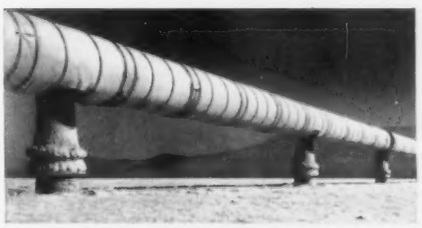
SALT CAKE

OF HIGHEST PURITY

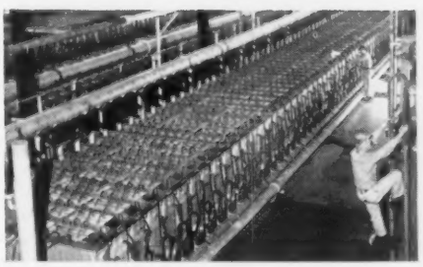
SODIUM CHLORATE

FOR CHLORINE DIOXIDE BLEACH

SEARLES LAKE
at Trona, California.
Source of *natural* sodium sulphate, essential for quality kraft production



HENDERSON, NEVADA.
Source of $NaClO_3$ for the *SOLVAY* high-stage chlorine dioxide pulp bleaching process.



Add another step forward in American Potash & Chemical Corporation's continuing diversification program! Trona has long been the leading source of *natural* sodium sulphate (Na_2SO_4) from the brines of Searles Lake, so essential in quality kraft production. Now from American Potash & Chemical Corporation (Nevada) (formerly Western Electrochemical Company) Trona serves the industry with highest purity sodium chlorate, used extensively in the SOLVAY high-stage chlorine dioxide pulp bleaching process. Two dependable sources, two quality products—a combination that can't be beat!

American Potash & Chemical Corporation

TRONA

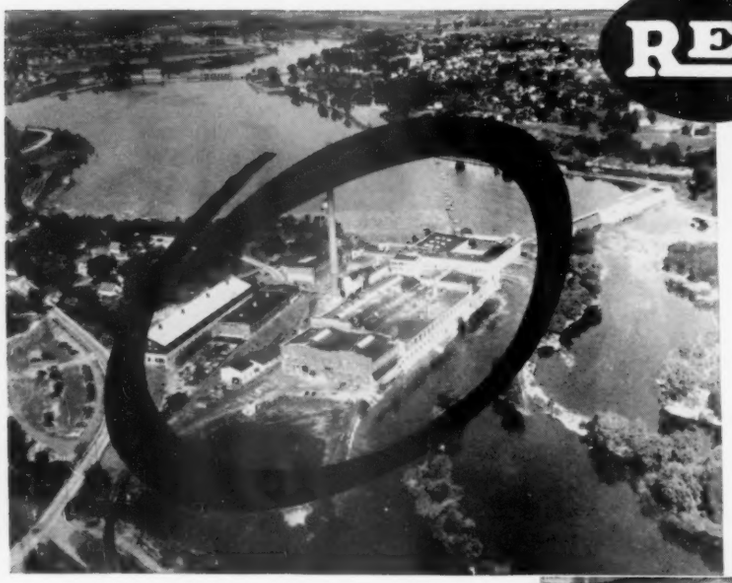
Los Angeles New York Atlanta San Francisco Portland (Ore.)

Producers of: Borax • Potash • Soda Ash • Salt Cake • Lithium Bromine • Chlorates • Perchlorates • Manganese Dioxide • *and a diversified line of specialized agricultural and refrigerant chemicals*

Plants: TRONA and LOS ANGELES, CALIFORNIA
HENDERSON, NEVADA
(American Potash & Chemical Corporation (Nevada)
SAN ANTONIO, TEXAS (American Lithium Chemicals, Inc.)

Economical solution to a pollution problem

REX® VERTI-FLO®

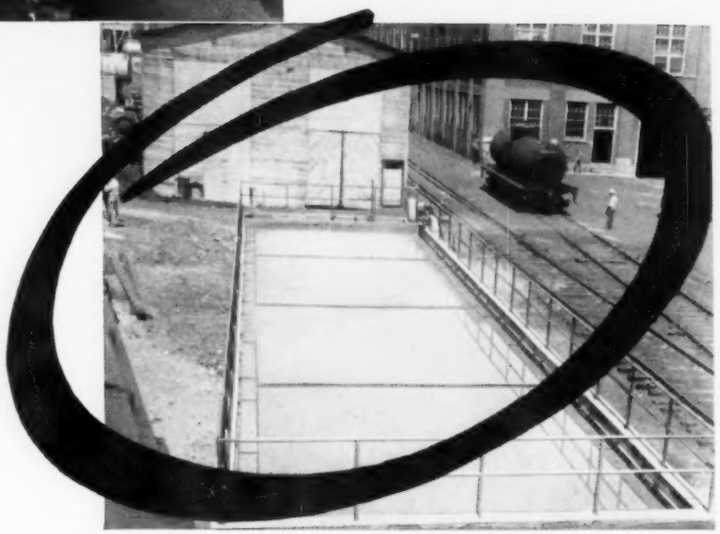


PROBLEM

To eliminate pollution of the Fox River caused by de-inking plant waste...a daily 700,000 gallons with a high wood fiber and clay solid content.

ECONOMICAL SOLUTION

Rex Verti-Flo. The daily effluent of 700,-000 gallons may now enter the river minus about ten tons of fiber and clay.



In their current anti-pollution program, why did Combined Locks Paper Company choose Rex Verti-Flo? Because of the design, installation and operating economies assured by this unique clarifier.

Rex Verti-Flo design divides a horizontal-flow settling tank into a series of smaller, vertical-flow cells. This unique cellular construction assures up to four times more tank capacity than conventional settling tanks. Detention times are from one-fourth to one-half those required in ordinary tanks...effluent is of maximum clarity.

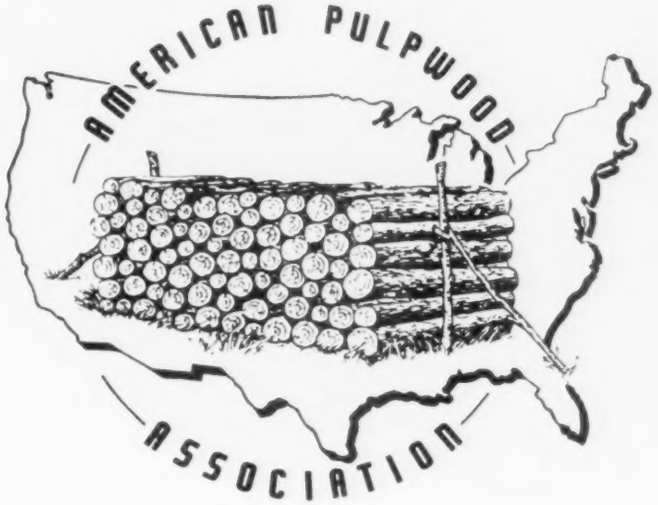
Translated into dollars and cents, here are what those advantages mean: lower construction and equipment costs since smaller tanks can be used, lower operating costs, lower maintenance costs.

Rex Verti-Flo is available in "packaged" steel tanks for smaller flows or in concrete tanks for larger flows. Why not get complete information? Send for your copy of Bulletin 315-92, "Packaged Industrial Waste Treatment." Write CHAIN Belt Company, 4691 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT COMPANY

Milwaukee 1, Wisconsin

PULPWOOD ANNUAL
1957



Edited by

AMERICAN PULPWOOD ASSOCIATION

Published by

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Try the 2 New . . . All New

HOMELITE CHAIN SAWS

6 Horsepower "Power Twins"

Take your pick! One of these two new Homelite Power Twins will do your woodcutting jobs faster, easier, more profitably.

Here's power . . . 6 full, hard-hitting horsepower . . . to make even the toughest cutting jobs a cinch. *Here's light weight* . . . the lightest 6 horsepower chain saws in the world — for easier handling and more production with less effort. *Here's low-cost dependable operation.* Homelite's new short-stroke, high-compression engine minimizes wear and assures less down time, lower maintenance costs, longer chain saw life. Both "Power Twins" cut left, right, up, down, upside down to handle any type of job. Try *each* of the "Power Twins" and choose the one that's right for you.

6 Horsepower 22 Pounds

GEAR DRIVE

Top Production. Rugged 6 horsepower engine with gear drive gives you the lugging power to bring down the largest, toughest trees faster and easier. Built for hard, everyday use, the 6-22 is a real production cutter's tool.

More Profitable Cutting. This smooth-operating Homelite brings down time *down*. You get longer engine life, spend less time out-of-the-woods for maintenance and repairs . . . less time refueling the big new gas tank. You cut more efficiently for more profitable cutting.

Money-Saving Attachments. The Homelite 6-22 is the newest one man chain saw that has plunge-cut bow, brush cutter, and clearing attachments available. You can make a quick switch and be ready in seconds for any type of cutting.

Cuts through 20 inch trees in 18 seconds. Brings down trees up to 7 feet in diameter.

6 Horsepower 19 Pounds

DIRECT DRIVE

Easiest Handling. The EZ-6 weighs only 19 pounds — with every ounce perfectly balanced. Built for rugged professional use, this fast cutting 6 horsepower chain saw is extremely easy to handle — even an amateur can operate it with little strain or effort.

Fastest Cutting. This direct drive chain saw, with its fast chain speed and light weight, makes quick work of trees up to 5 feet in diameter. Packed with 6 full horsepower, it cuts 8″ oak in 4 seconds, 18″ pine in 12 seconds.

A Profitable Investment. The low-cost EZ-6 starts to pay for itself the first time you use it. Turns woodlots into big cash crops . . . cuts timber, pulpwood, fence posts, cordwood. This high speed direct drive chain saw has enough dependable power to make either full or part-time cutting profitable.

Cuts 8″ hardwood in 4 seconds
Cuts 18″ softwood in 12 seconds
Fells trees up to 5 feet in diameter

Homelite builds and sells more chain saws than any other company in the world.

WIN

A FREE CHAIN SAW EVERY YEAR FOR LIFE
IT'S EASY
Nothing to Buy
Nothing to Write
No Obligation

Just visit your Homelite dealer and have a free demonstration of the Homelite Power Twins. You may have *three* chances to win!

1. A free Homelite chain saw of your choice every year for life, or
2. One of 25 Homelite chain saws given away by Homelite District Offices.
3. Plus hundreds of Homelite Chain Saws given free by Homelite dealers in local contests.

Register Now! This promotion is limited to residents of the United States and is subject to local state, city and county laws.

Find Your Homelite Dealer in The 'Yellow Pages'

HOMELITE

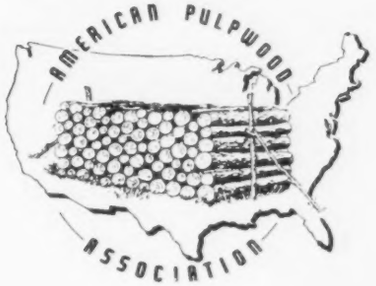
A DIVISION OF TEXTRON INC

7707 RIVERDALE AVENUE · PORT CHESTER, NEW YORK

Manufacturers of carryable pumps, generators, chain saws, blowers

A complete line of chain saws for every cutting job.

PULPWOOD ANNUAL—1957



CONTENTS

PAPERS OF ANNUAL MEETING—1957

INDUSTRIAL DEFENSE AND PULPWOOD PRODUCTION

Manpower Problems in the Woods—Louis Levine 89
How to Protect Our Forests in War—Merle S. Lowden 93
Industry's Part in National Defense—William E. Haines 97

STEPPING UP PRODUCTION PER MAN DAY

What Price Further Mechanization?—T. A. Walbridge Jr. 100

FOREST SITE CLASSIFICATION, PREPARATION AND IMPROVEMENT

How Soil Management Aids Growth—Charles E. Kellogg 104
What Does Site Preparation Cost?—Kenneth P. Davis 108
How to Improve Forest Sites—T. E. Maki 113

INCREASING UTILIZATION OF WOODS AND MILL LEFTOVERS

What Does Sawmill Chipping Cost?—G. W. Brumley and C. M. Mathewson 119
Standardizing Railroad Car for Chips—Thomas Baker 125
Using Hardwood Logging Residue—Leland W. Hooker 128

REVIEW OF ASSOCIATION ACTIVITIES 135

ORGANIZATION AND PROGRAM FOR 1957-58 139

FOREWORD

Not to be outdone by previous years, this 1957 PULPWOOD ANNUAL is released with news of a record pulpwood consumption. The volume of upwards of 35,800,000 cords consumed in 1956 represents the top level to date.

In keeping with the continued growth of the industry it represents, the American Pulpwood Association has expanded its program and activities in order that its members may be better informed on pertinent issues. This ANNUAL, including the proceedings of the APA's 1957 Annual Meeting, a review of its activities during 1956, and its organization and program for the coming year, reflects a top level of performance by the Association since its organization in 1934. We recommend this ANNUAL to producers and consumers of pulpwood not only in this country, but throughout the wood-using industries of other countries.

For the publication of this and previous ANNUALS, we are indebted to PULP & PAPER, a Miller Freeman Publication.

W. S. BROMLEY
Executive-Secretary

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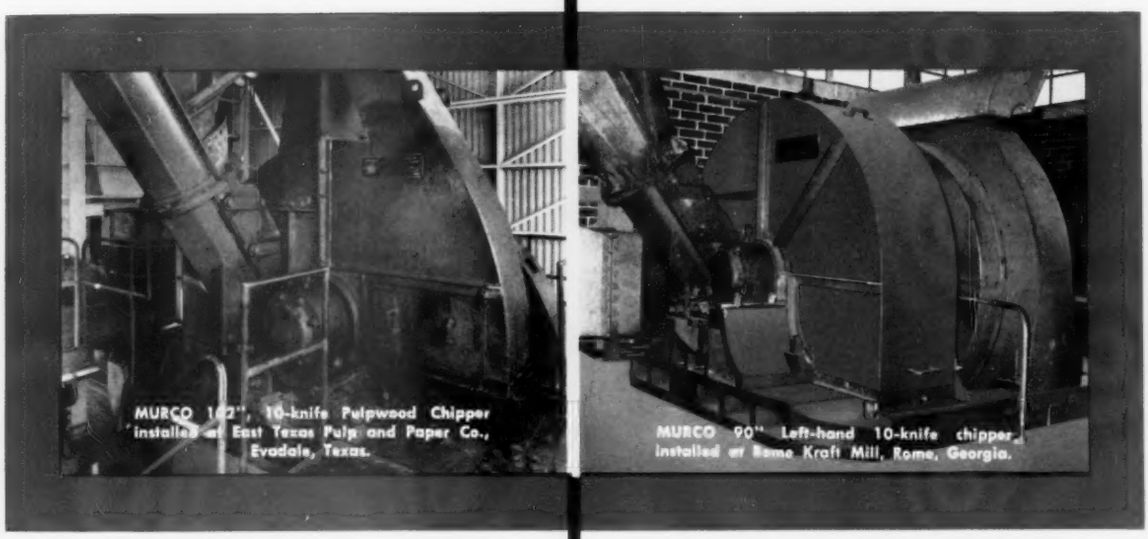
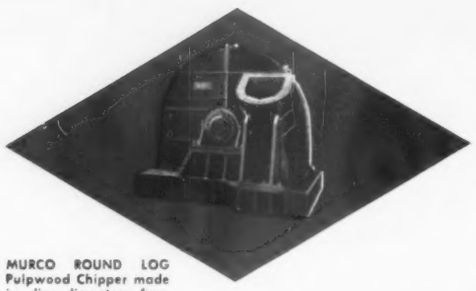


MURCO 102", 10-knife Pulpwood Chipper installed at East Texas Pulp and Paper Co., Evadale, Texas.

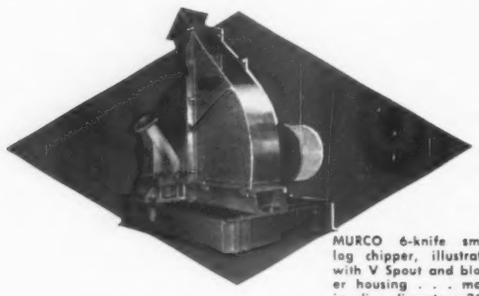
MURCO 90" Left-hand 10-knife chipper installed at Rome Kraft Mill, Rome, Georgia.

MURCO

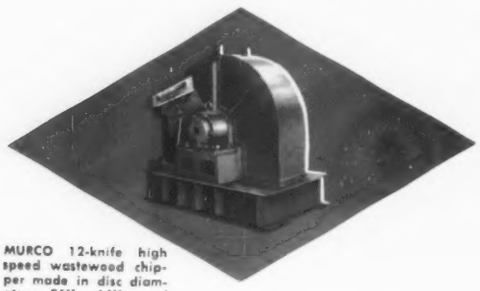
Pulpwood Chippers



MURCO ROUND LOG Pulpwood Chipper made in disc diameters from 54" to 153".



MURCO 6-knife small log chipper, illustrated with V Spout and blower housing . . . made in disc diameters 36", 42", 48", 54" and 60".



MURCO 12-knife high speed wastewood chipper made in disc diameters 56", 64", and 72".

DESIGNED TO PRODUCE MORE AND BETTER CHIPS AT LESS COST

Incorporating the most desirable features for today's production requirements, MURCO Pulpwood Chippers are the result of long and careful study of the various factors that contribute to outstanding chipper performance in producing more and better chips at less cost, less sawdust, fewer slivers, free from repairs, yet at the same time having production records of 100 cords or more per hour. MURCO heavy design construction reduces vibration . . . is compact and requires less floor space. MURCO Round Log Pulpwood Chippers are designed for use where production is high, where maintenance must be held to a minimum and quality chips are a "must". Made in disc diameters from 54" to 153". Other pulpwood chippers are made in sizes 36", 42", 48", 54" and 60" . . . designed along the general lines of the Round Log Chippers are MURCO 12-knife high speed wastewood chippers made in disc diameters 56", 64" and 72", and MURCO mechanical feed 4-knife wastewood chipper with 75" disc diameter . . . all backed by years of constant development so that each year results in an improved chipper design, the latest of which is MURCO UNI-CHIP.

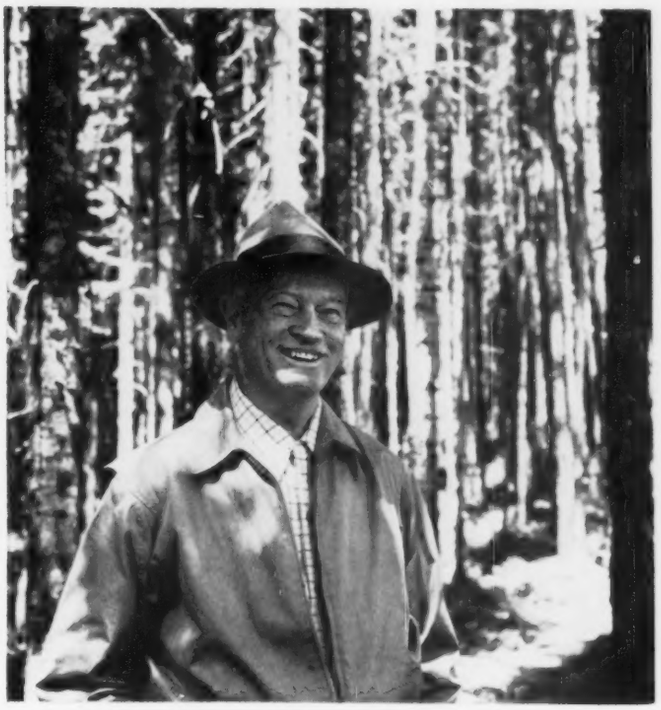
A complete and detailed story on pulpwood and wastewood chippers is contained in the MURCO Chipper booklet . . . specifications of each model. We will gladly send you a copy upon request . . . Write for it today.

D. J. MURRAY MANUFACTURING CO.

Manufacturers Since 1883

WAUSAU • WISCONSIN

DEDICATION



JOHN H. HINMAN

The forests of northern New Hampshire are a long way from the New York office of John H. Hinman, Chairman of the Board of International Paper Co., but the mark of the forest is strong on the man.

John Hinman went to work as a wood producer in his native northern New Hampshire, following his graduation from Dartmouth College in 1908. In 1913, he became associated with a subsidiary of International Paper Co. as Woods Manager. He has never worked for any other company.

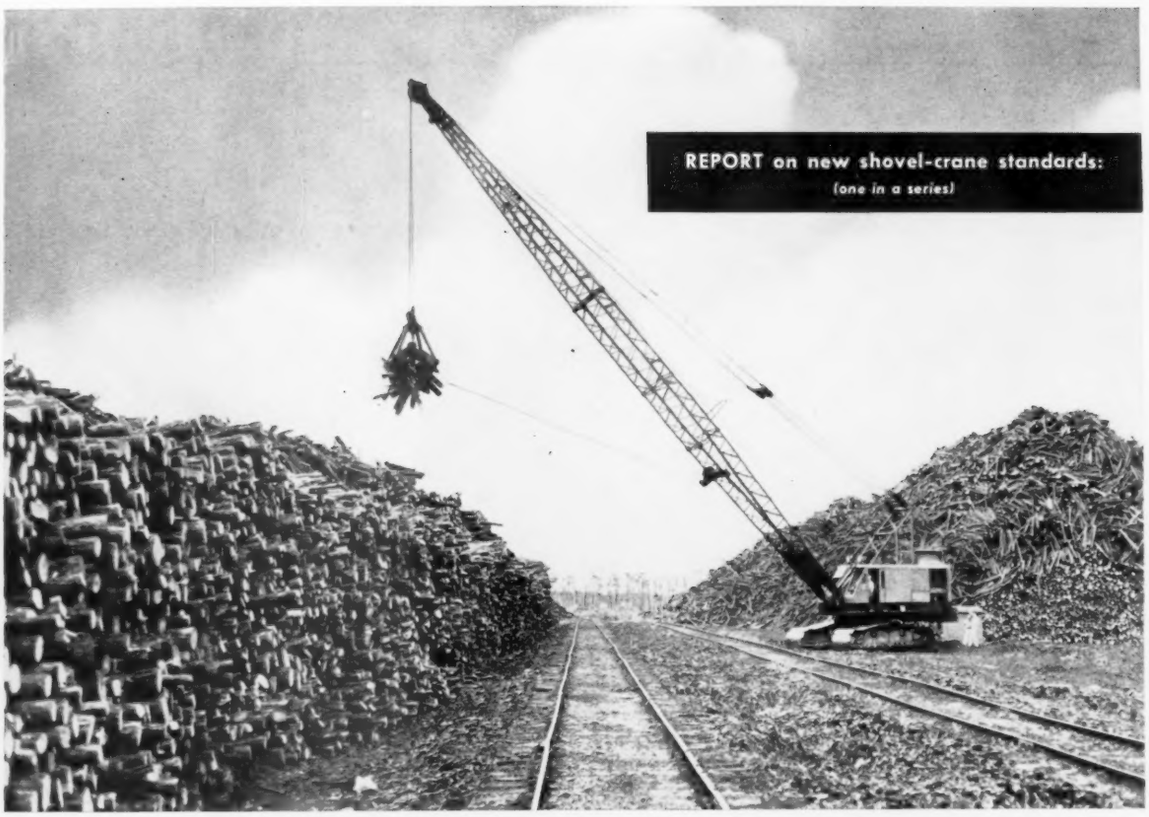
His career, as a Woods Manager and later as an executive of the largest paper company, spans an era of dramatic change in the practice of forestry. When a wood producer's efficiency was measured only by his ability to produce the greatest amount of wood at the lowest possible cost, John Hinman was ranked with the best. But many years ago he saw that this was not going to be sufficient.

Early in his career he realized that the future of his company and his industry did not lie in any narrow concept of the uses of wood but in the broadest possible approach to the forest as the source of endless harvests of an increasingly wide range of crops.

Under his leadership International Paper and its subsidiaries have developed excellent forest management programs administered by a top-ranking staff of foresters and technicians. His interest in forest management and his insistence on more efficient utilization of the forest crop have been a strong force within his company and have contributed substantially to the increasing public acceptance of the principles of modern forest management.

In the days of the great depression of the early 30's when strong pressures were on industry, John Hinman with Howard Beedy and Charles Luke formed the American Pulpwood Association to provide a single, authoritative voice for the pulpwood industry. As the Association's first president, and since as an active and interested member, he has always stood 100 percent behind the Association and its programs.

John Hinman's career has been based to a great extent on two firm convictions: that the woodlands he loves can grow and flourish as they provide our nation with increasingly abundant and varied harvests and that the continuing health and abundance of these woodlands can best be secured within the framework of a competitive, unregulated economy.



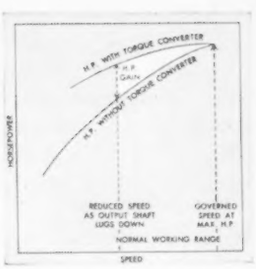
Getting bonus power...extra line pull

Size for size, Link-Belt Speeder shovel-cranes deliver greater usable horsepower than other machines using the same engines

Engine size alone is not a correct measure of a shovel-crane's actual *usable* horsepower. Thus, it's important to know Link-Belt Speeders deliver more *usable* horsepower or line pull at the drums than other machines using the same engine, yet remain well within engine manufacturers' recommended operating speeds.

Why? A Link-Belt Speeder is designed and built with extra size and strength in shafts, gears, clutches and structural members. It has the strength to fully utilize available engine power.

It's another reason why Link-Belt Speeder shovel-cranes are setting entirely new high standards of efficiency. For complete facts, contact your Link-Belt Speeder distributor or write—Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 14.628



TORQUE CONVERTERS are available for all Link-Belt Speeder models, supply power to match the load . . . provide sustained power, increased line pull to maintain high production even with heavy loads and to handle these big loads smoothly, accurately!

POWER HYDRAULIC CONTROLS are operated with the flick of a finger, provide fast, positive response . . . perfect feel of the load for added safety. They're standard equipment on all crawler and rubber-tired models ½ to 3-yd, 8 to 75-ton capacities.

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

Industrial Defense and Pulpwood Production

SPEAKERS AT FIRST SESSION: Left to right are LOUIS LEVINE, U.S. Dept. of Labor; MERLE S. LOWDEN, U.S. Forest Service and WILLIAM E. HAINES, U.S. Dept. of Commerce.

Manpower Problems in the Woods

What this industry needs to do in order to develop a stable and trained work force for woodlands operations

By LOUIS LEVINE
U.S. Dept. of Labor

● The U.S. Department of Labor and the public employment offices throughout the country recognize that manpower effectiveness holds the key to industrial growth, expansion of our productive capacity, and indeed our economic well-being. It is obvious that manpower readiness for mobilization is not created overnight. It is dependent upon the actions we take in advance of an emergency to create a competent skilled and adaptable work force. This means that industry must now recognize the importance of manpower to meet our economic needs.

Economic Background . . .

In order that we may better understand the current manpower situation and its implications in an expanding economy, I would like to briefly sketch the economic background which must be taken into account. Since the close of World War II we have been experiencing an industrial revolution of gigantic proportions such as has never been known. During the past decade and a half we have witnessed record-breaking expansion in our industrial productive capacity, the emergence of new industries and the introduction of new industrial techniques and processes. The developments in the electronics field, the widening use of automation, and the application of nuclear energy to peacetime uses, all indicate that we are still at the threshold of tremendous economic changes.

For a number of years we have been investing at an annual rate of approximately $30 billion in new plants and equipment. In the past year such investment amounted to $35 billion. Clearly, new plants and equipment mean obsolescence of existing plant and production methods. At the same time, government and private enterprise together have been investing in research and development at an annual rate of approximately $5 billion. Such research by our scientists, translated into industrial application by our engineers, spells new products, new production techniques, and new markets.

These economic developments made it possible for us to reach living standards never previously attained. In 1940, the total value of goods and services produced in this country was barely more than $100 billion. Ten years later the gross national product had risen to $285 billion. This past year the value of all goods and services produced in the U.S. was approximately $412 billion.

An examination of our industrial production indicates that we doubled our output between 1939 and 1950. Since then industrial production has increased another 25%. In the past 15 years, steel production has gone up 75%; production of crude petroleum has gone up 80%; electrical output has more than trebled. In your own industry, consumption of pulpwood has doubled since 1945, and there is every indication that further increases may be anticipated in the years ahead.

Employment at Peak . . .

All current economic indexes make it clear that we are at record levels of overall economic activity and near maximum employment. We now have a total force, including men and women in the armed services, of about 68.5 million people. Of this total, approximately 65.8 million are in the civilian work force and about 2.8 million in the armed services. All but 2.9 million are employed. The 63 million people employed in civilian jobs in January represent 95.5% of our civilian work force.

Our manpower resources and our

labor supply for industrial mobilization are in general now employed. Therefore, only to the extent that we effectively train and utilize our employed people can we make any significant contribution to developing and improving our manpower readiness for industrial mobilization.

The economic developments outlined above result not only in vast industrial expansion but also have created many new employment opportunities. The two outstanding characteristics of our manpower situation are: an increasingly tight labor supply and a rapidly changing composition of our work force.

We are, of course, acquainted with shortages of scientists and engineers and the manpower problems that confront us in such fields as education, medicine and health services. These occupational shortages also extend to skilled production workers and people in subprofessional groups.

At the same time we find that the technological improvements have resulted in a decreased proportion of unskilled workers and increased proportion of semi-skilled, skilled, and technical workers. In 1910, unskilled workers represented 36% of the work force. By 1950 they had declined to only 20%. During the same period semi-skilled workers rose from 15% to 25% and skilled workers from 12% to 14%. These trends are expected to continue.

This Has No Appeal . . .

Unmechanized, this woodsman in the North Country puts in a hard day's work but won't produce as much as his mechanized counterpart; one reason why working in the woods is not as attractive as it could be.

This Industry's Responsibility . . .

Against this economic background, what are the problems of manpower readiness for mobilization which confront the pulpwood industry? It seems to me that the first problem is to realistically attack the manpower situation which currently exists and is likely to continue under so-called peacetime conditions. The pulpwood industry, just as any other industry, must adapt its personnel management and its manpower practices to the changing economic conditions.

In many ways the manpower situation that confronts the pulpwood industry is similar to that facing agriculture and other rural industries. There can be no denial that industrial employment opportunities in urban areas frequently have competitive advantages in wages, working conditions and living standards over those of the pulpwood industry.

It seems to me that a first step in this industry to assure the work force required involves a careful appraisal of the location, economic characteristics, and competitive relationships between the pulpwood and other industries.

In this industry more than two-thirds of its raw materials comes from small contractors, farmers, and small woodlot owners. The production of pulpwood generally is not their major business. Some of these operators produce as little as one-half a truckload of pulpwood a year. The average number of workers employed in a particular operation is between 5 and 10. The period of employment is relatively short, generally not much more than 8 months during a year. The operator relies upon farm people and casual workers as sources of labor supply. These factors add to the difficulty which pulpwood producers face in recruiting and retaining their needed work force.

Scientific forest management and the trend toward the cultivation and harvesting of trees as crops must mean increasing mechanization and therefore a growing need for skilled workers, at least for the maintenance and repair of equipment. In addition, there are labor needs for foresters, woodlands managers, and wood procurement people. To these categories you must add those required in less skilled occupations.

One primary objective should be a trained and stable labor force. At the same time you must recognize that if a man works only a few days for an employer he is not likely to be very skillful in the use of equipment nor to be much interested in its maintenance. Neither are occasional workers likely to have much concern about preserving young trees for future growth, nor selecting only the most stable trees for cutting, nor making the most of the trees that are cut.

Reduced Labor Supply . . .

Unless this industry develops a stable trained labor force, it is likely to find that its labor supply will continue to dwindle. More and more, workers are leaving the farms for cities and factories. The number of men working on farms dropped from 8.4 to 5.3 million between 1940 and 1956.

Migration from farms explains only one part of the loss of pulpwood labor supply. Another development which is becoming increasingly important is the location of industrial plants in rural areas. In such instances, farm people have the alternative of working off the farm in pulpwood operations or in competing industrial activities nearby. With modern developments in transportation and highways, commuting to industrial plants has reduced labor supply from farms as much as migration away from the farms. These new competing industrial activities are coming closer to

This is a Boon to Pulpwood Production, and to Labor . . .
Mechanization (pulpwood pallets, trucks, tractors and chain saws), complements this small woods labor crew to stabilize wood flow to mill, offsets swing of rural labor to cities.

pulpwood operations, and increasingly must be taken account of in order to assure needed labor supply.

Steps to Take . . .

If this industry is to compete effectively with other industries, increasing consideration must be given to steadier employment, wage relationships, working and safety conditions and even fringe benefits. APA's Executive Secretary, in talking before the National Paperboard Assn., pointed out that pulpwood workers must be employed for a longer period in the work-year; that wages of woods workers must be made increasingly attractive; and that persons brought into the industry must be assured of safer working conditions. Larger scale operations, acquisition of larger timber tracts, increased mechanization, better equipment and roads, and more careful planning, can all help to achieve these goals.

It will become more and more important for this industry to develop a work force which is identified with it. For example, in the New England and New York wood areas, pulpwood operators have traditionally relied upon Canadian woodsmen to make up for a lack of local labor. In the face of Canadian industrial expansion with attractive alternative employment opportunities, this foreign worker labor supply may not be as readily available in future years. In the South, with its large pulpwood production, there is increasing competition from plants locating in rural areas as a part of the rapid industrial development of that region of the country.

Improvement of safety conditions in the pulpwood industry is an important element in attracting workers. Logging is one of the most hazardous of all industries. The injury rate in logging is just about six times as high as the average for all manufacturing industries. It is almost twice as high as the rate in sawmills and planing mills. Better training of new workers, more careful observance of safety rules and more rigid safety standards introduced into this industry will help solve manpower problems.

More recognition should be given to unemployment compensation and workmen's compensation laws in the states in which pulpwood operations are located. The extent to which these laws compensate woodworkers' time lost due to involuntary unemployment, or time lost because of industrial injury, cannot be ignored. Such labor legislation is a factor in attracting workers to this industry.

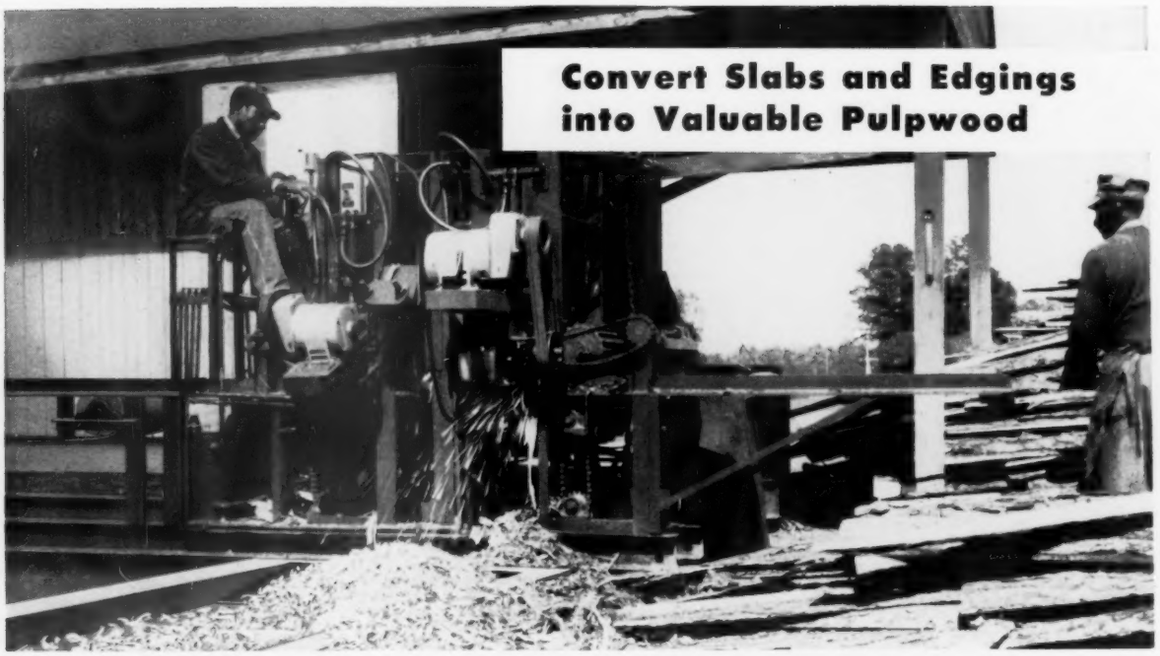
Utilization of Manpower . . .

Pulpwood producers should prepare themselves to recruit and employ older workers instead of relying heavily on young workers in the prime of physical fitness. This, of course, will require some rearrangement of job assignments. Increasingly, a major part of our work force potential is made up of people 45 years of age and over. While our population between 1900 and 1950 doubled, the number of people 45 years of age and over tripled during the same period and those over 65 quadrupled. There are now more than 47.5 million Americans over 45 years of age. Workers in this age category represent a very important manpower resource. This industry should exercise care to assure that rigid age specifications do not deny access to these workers.

The Bureau of Employment Security and affiliated state employment security agencies together operate a nationwide system of public employment offices. Primary objectives are to maximize employment, to reduce unnecessary labor turnover, and to shorten the interval between jobs for workers who become unemployed. The public employment offices represent the nucleus of our civilian manpower machinery and will undoubtedly constitute a major operating arm of our manpower program in the event of mobilization.

Take advantage of the industrial services, placement assistance, and the authoritative labor market information which this system can make available. This technical advice and assistance can supplement this industry's efforts to develop a stable and competent work force.

To the extent this industry actively takes steps to attract and retain workers, it will be assuring itself of manpower readiness for mobilization. The developments in economic expansion and industrial change and the competing demands for manpower become intensified under mobilization conditions. Now is the best time to prepare for such a situation. This industry is confronted with especially difficult problems in this regard. Nevertheless, the imaginative capacity and the genius for adapting to changing conditions which it has displayed on other fronts, if applied to manpower, can help to meet manpower needs in a mobilization situation.



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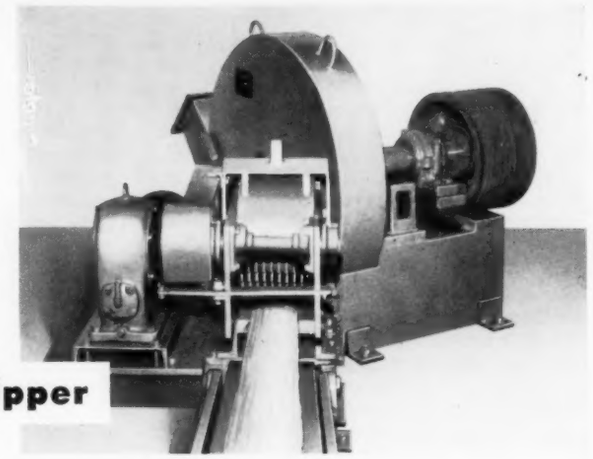

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This is What Pulpwood Industry has to Defend Against . . .

How to Protect our Forests in War

What is being done by civil defense agencies to meet any possible enemy attacks affecting U.S. timberlands

By MERLE S. LOWDEN
U.S. Forest Service

• I am glad to discuss plans for meeting a possible enemy attack affecting our forests. We all hope this will never happen. However, wishful thinking or mere talk will not effectively handle catastrophic situations which we have been informed could happen in our forest areas as a result of atomic attack. Any plans or preparations made in advance to determine exactly who does what when the critical time arrives should mitigate the chances for utter confusion and great losses.

Preparations for such a serious situation are not entirely new. Valuable experience in planning for possible wartime fires was gained in preparations made during World War II. Special crews were stationed at strategic points throughout the forested areas, particularly in areas of greatest importance to the war effort. Wartime forest protection councils were very effective in many states in planning for coordinated attacks on fires. Forest industry representatives served on many of these councils.

Fortunately enemy action of this type developed to only a minor extent. Some Japanese paper balloons carrying incendiary bombs reached targets in our western forests but most of them landed during periods unfavorable to them and we did not have serious fires. I was working on the national forest in eastern Oregon where an anti-personnel bomb attached to a paper balloon was triggered and killed five people. These were the only casualties from enemy action in the continental United States in World War II. Even in this case the incendiary bombs did not start a serious fire.

State Protection Procedures . . .

The present period of planning for the modern and probably much more destructive attack began with wild land protection plans made by protection agencies in 1951. As a result of an exchange of correspondence between the President and the governors of the various states, a general procedure for preparing state-by-state plans for such protection was worked out.

The federal departments of Interior and Agriculture were asked to correlate the work on a national basis and to work with individual states in preparing these plans. Available equipment was inventoried, procedures were worked out, and plans completed in 43 of the 48 states. The planning work was initiated under the general direction of a national committee with membership from the three primary wild land protection agencies—Interior, Agriculture, and the State Foresters.

State committees were formed with essentially the same representation except that for most, the state director of civil defense or his representative was included as a member or worked in close association with state committees. This planning job involved active participation of numerous fire control experts with possibly 500 to 800 men active in the program at the peak of the planning project. Hence the plans developed represented the

combined efforts of many fire control experts from all levels of management. These plans have received some minor revisions but have not been re-done since 1951.

It became apparent about three years ago that if such plans were to be of greatest value in time of emergency they must be kept current. Changes were taking place in general arrangements for civil defense throughout the country. Revolutionary changes such as the H-bomb were occurring in the weapons available for attack. People were aware, through thermonuclear experiments, that future wars could be far more destructive, and previous civil defense plans would have to be modified to meet that eventuality.

The 1950 Civil Defense Act had provided that agencies of the federal government would assist in civil defense tasks in which they were best fitted by technical know-how and experience. On this premise the federal civil defense administrator in Sept. 1954 delegated the Department of Agriculture to: (a) plan a national program, (b) direct federal activities, (c) provide technical guidance to states concerned with the prevention and control of fires caused by enemy attack in rural areas of the U.S. This is the basis for the present planning project. It is one of 33 delegations made to federal agencies by the Administrator of Federal Civil Defense Administration.

Civil Defense Responsibilities . . .

The Act of 1950 provides that it is "the policy and intent of Congress that this responsibility for civil defense should be vested primarily in the several states and their political subdivisions and the federal government shall provide necessary coordination and guidance." Primary responsibility for civil defense rests with the several states.

The Federal Civil Defense Administration is directed to prepare national plans and programs. That agency reviews and coordinates the activities of the federal agencies, makes current provisions for necessary communication and for dissemination of warnings, studies and develops measures designed to afford protection to life and property, conducts and arranges training programs, and disseminates information concerning Civil Defense.

This basis of primary responsibility within the state and with guidance and coordination at the national level, has been the thesis for the planning to date in applying civil defense to the nation's forests and rural areas. It was appropriate that the Dept. of Agriculture assign this work to the Forest Service. With more than a half century of firefighting experience and close working relationships with the states and other protection agencies, the Forest Service through its field organization was in a position to carry out this federal planning and coordination job.

USFS Aids Coordination . . .

To assist in federal coordination, the chief of the Forest Service appointed a National Committee on Rural Fire Defense. This committee represented essentially the same groups that were working on wild land fire problems back in 1951. The Dept. of the Interior, the Forest Service, and the State Foresters were again represented. A representative of the Fire Services office of Federal Civil Defense Administration and a representative of the Extension Service of the Dept. of Agriculture were added.

While approximately one billion acres of rural lands in this country are now under organized fire protection, there remains more than one-half billion acres that have little or no organized protection. Much of this is not strictly timber but is agricultural in nature. People in these farming areas have worked closely with the Extension Service and thus it is appropriate to have a representative of that agency on the national committee.

The committee meets several times a year and at the present time I am chairman. The committee recommends general guidelines for the work and considers many problems in organizing and correlating this big task.

The relatively small sum which the Forest Service is receiving for the first time this year goes to pay part of the salary and some of the expenses of a man in our Washington office and a staff representative in each of our nine regional offices in the United States. Funds were insufficient this year to pay for the yearlong salary of any of these men. Like other civil defense duties of federal agencies a large share of the rural defense work is done by regular staff members.

The special staff men are the catalyst between the various agencies concerned with rural fire protection. They meet with state committees, assist with state planning, provide technical guidance to state and local protection agencies and endeavor to work out a host of problems which seem to be inherent in this job. Much of the work is of a pioneering nature. Conditions vary greatly and uniform national rules are not applicable. For these and other reasons the job calls for technical skill, initiative, and basic knowledge of fire and human behavior.

These men have been assigned to this work only a short time but as rapidly as possible they will make themselves known to members of this industry. The Forest Service expects them to work closely with all who have something to contribute or have a vital interest in protecting forest and other rural lands.

The Bureau of Land Management has the regular responsibility for protecting the greater part of Alaska from fire. Some administration funds have been provided to them and planning work on this project in that area is going forward rapidly.

No exact requirements have been set up for the composition of state Rural Fire Defense committees. The protection agencies and others such as the state director of Extension Service or the extension forester, the state director of civil defense, and industry representatives have banded together to carry on the work. In most states the state forester is the chairman, but choosing a chairman is up to the members.

Progress of these committees has varied greatly between states. Some states have met frequently and are well along with their plans. In other states where the problem seems less pressing or interest has not crystallized, not so much has been done.

Typical State Defense System . . .

In the state of Washington, L. R. "Mike" Webster, state forester, is committee chairman. There are representatives of state civil defense, state fire marshal's office, state extension service, east side industry, west side industry, Bureau of Indian Affairs, National Park Service, and USFS. Many and varied interests are represented.

It would probably have been quicker for someone in Washington or someone in our regional offices to sit down and make a paper plan for each state. However, the program to date has been based on the premise that planning should be done by the people that are going to do the job and as close to the job as possible.

Meeting together and working on these plans has accomplished a great deal. Many folks have met for the first time. They have learned about each other's work and problems.

The current or initial phase of this work is an interim or preliminary plan designed to make it possible to activate existing fire protection resources in a coordinated manner. When state plans are completed, operating procedures for correlation between states

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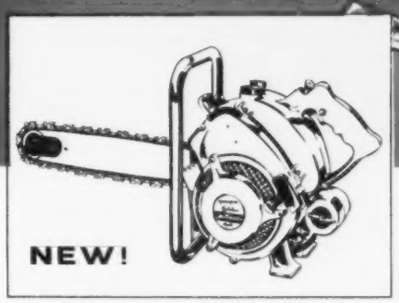

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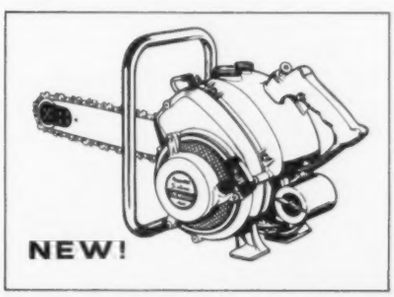

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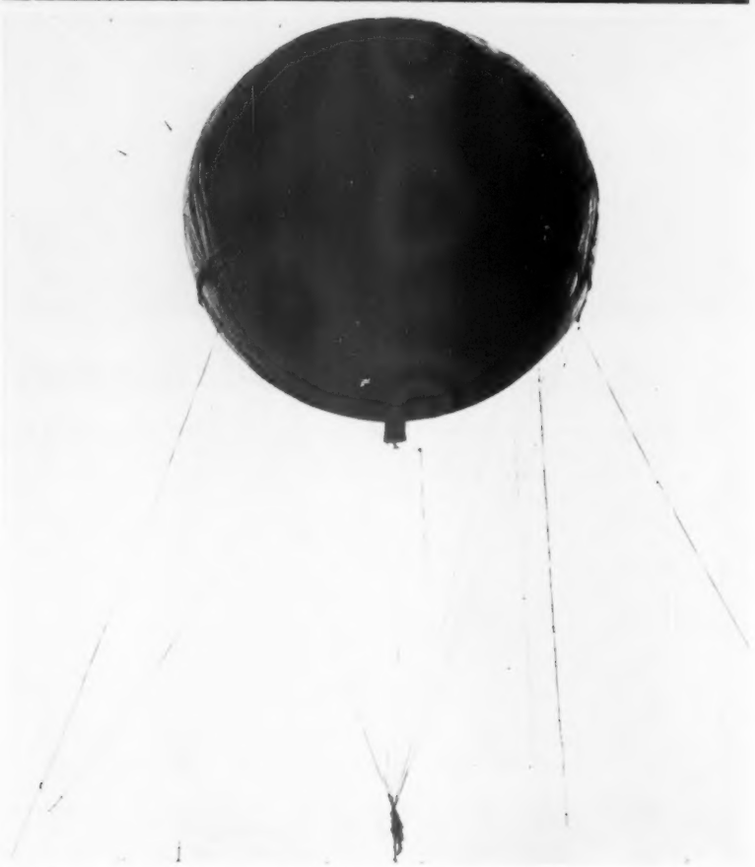

In War, Balloons Like These May Menace Forests . . .

The writer of this article mentions threat to forests from Japanese incendiary paper balloons in World War II. (Few persons know U.S. Air Force recovered 165 of them.) Balloon is made of five layers of mulberry paper, each thin as cigaret paper, but strong and water-repellent when laminated together. Balloon is 100 ft. in circumference, filled with hydrogen. Suspended like a chandelier below balloon by 19 shroud lines, each 45 ft. long, is bomb load with automatic release mechanism, device for automatic control of altitude, and automatic demolition blocks to destroy the balloon in the air.

At top, aerial photo of Japanese balloon taken by a pursuing Bell P-63. At bottom, Japanese balloon recovered in January 1945 is inflated for lab tests at California base.

—Special PULP & PAPER pictures from U.S. Air Force

within each Federal Civil Defense Administration region will be prepared. General operational procedures for conducting the work on a national level must also be clearly defined.

The second phase of the planning job will be to work out more specific arrangements for certain high priority areas, and provide for special services not a part of peacetime fire fighting. For these we will need to clearly define disaster potentials and determine what will be done on a priority basis. Areas and locations of greatest strategic importance will need special equipment, additional manpower and more and different facilities for communications, housing and transportation.

In areas where there has been no organization for fire protection, crews will be organized. Training of potential fire fighters who have not had this experience must be done. Special services such as radiation monitoring of fallout, decontamination of food, equipment and materials will need to be incorporated into the plans.

As these groups move into the third phase of our preparations, it will be necessary to test out the plans. Where weaknesses are found, reorganization and new preparations must be made. This phase will be a continuing one. Training and stockpiling of supplemental strategic equipment will be important in this phase.

The fourth and last phase, of course, will be putting plans into operation if the emergency arises.

The Future Program . . .

All of this is a big job and will not be done overnight or without running into problems. Questions are constantly popping up for which we do not have ready answers. However, possible answers must be found and resolved in the planning stage if our rural areas are to be protected.

Those who will do the job must know what authorizations they have to go by. If existing laws or regulations do not permit doing what needs to be done, then recommendations will be made for desirable changes.

How will fire protection fare in the requisitioning of equipment, manpower, communications, transportation? What will be its priority? These are complex problems but they must be resolved in conjunction with all other parts of civil defense. While we do not have the answers to all questions there are certain basic concepts which seem axiomatic in our planning.

Problems and situations will be handled locally as far as possible. Fire fighting will be done by established agencies and people who are now do-

ing the job as far as they are able. This means, as now visualized, that many pulpwood producers and their employes will continue to fight fires in their local areas whether the fires are from normal causes or from an enemy attack. The same wardens, rangers and other overhead will lead the crews as now. It certainly will be best to utilize known and tried equipment, experienced men, proven facilities and tested procedures as far as possible.

Local mutual aid agreements will be the backbone of district and state plans. We know that additional fire fighting power will be needed. These needs are being studied and tabulated. It is important that those who will be part of the action program are kept currently informed of where they fit into the plans.

Progress on preliminary action plans varies. Nearly all states are actively working and it seems likely that some plan will be formulated for every state before the coming summer. Undoubtedly some of these will be but preliminary drafts. There will be need for careful review. There will be unreconciled problems, and the plans will need testing.

There will be need to make "dry runs" just as we do with fire crews in our preparations for wild land fires that we are fighting every day some place in the country. There will be need to acquaint people in the rural areas, including farmers, pulpwood workers, loggers, mill men, and others, with what is being done.

State committees will want to work closely with members of the pulpwood industry. Undoubtedly members of many state committees have contacted industry representatives and are working closely with them. Your company logging bosses and fire wardens should know how they fit into local protection plans. Has their equipment and manpower been included in inventories? Have the woods bosses worked out arrangements for mutual aid between companies?

Probably some of you are acquainted with the work of state committees. I am sure they will welcome your suggestions and ideas. At the national level our committee is always anxious to receive ideas and suggestions that may help us in this work.

Preparations for handling all rural fire problems will not be worked out overnight. The job requires the best ideas and the closest of cooperation, if it is to be done successfully. If it is worked out, the protection folks and their cooperators will be ready to do an effective job when it is needed.

Industry's Part in National Defense

Importance of pulp and paper requires this industry to cooperate with government agencies to coordinate readiness

By WILLIAM E. HAINES
U.S. Dept. of Commerce

● We hear a lot these days about "maintaining a national posture of mobilization readiness." There is some chance that we may not know precisely what that means for the whole concept of mobilization planning has undergone many revolutionary changes since that fateful day at Hiroshima. Just as the power and effectiveness of modern weapons have increased at an incomprehensible rate so have the problems involved in contemplating their awesome consequences.

It has almost become a cliche to say that this nation's ability to resist and defeat aggression lies in its total capability to produce. Or, to put it another way—in its industrial production. If we believe this to be true what are we doing to assure its continuity? Have we really accepted the sobering fact that our production facilities are no longer impregnable to direct assault? There is considerable evidence to suggest that we have not.

Have we accepted the fact that a posture of readiness in 1957 entails far more than was ever required to meet any previous emergency in the nation's history? Perhaps not.

Further, just whose posture are we talking about? Is it enough that the military establishment shall acquire the most powerful and effective weapons, perfect the most efficient methods for their delivery, and devise a network of defenses to prevent or frustrate the strategic and tactical efforts of an aggressor?

Is it enough that the government shall be prepared to control the distribution of scarce materials and restrict or prohibit non-essential production, stockpile critical materials, expand and protect the mobilization base, determine mobilization requirements, and take many other steps required to meet a national emergency?

Even a casual analysis of the problem reveals that these things are not enough.

Job for Management . . .

Industry, as well as government, must assume a posture of readiness. Industry must be prepared to produce under the most severe and austere conditions. It is to be expected that government should take the lead in protecting the nation against the threat of attack whenever and wherever it may occur. Yet, government alone cannot do the job.

There are certain things which—if they are to be done at all—must be done by the owners and managers of the nation's production resources capable of producing for defense, defense-supporting and essential civilian needs. Call it the job for management. Only industry itself can prepare for the continuity of industrial management and production. Failure to take such steps entails dangerous risks.

We must make certain that government and industry, working together, develop the coordinated posture of readiness that is demanded by the uncertain times in which we live. This business of mobilization planning is a complicated business. The complexity and highly sensitive interdependence of our industrial organism is well known. We understand the importance of our industry to our daily lives and to the defense of our country.

When we think of mobilization we are apt to think of the hard goods required to wage and win a war. Perhaps there is a tendency to relegate other materials and products into positions of secondary importance. This

we must not do, for the old adage which went "for want of a nail a kingdom was lost" is no less true today—doubled and redoubled.

Importance to National Defense . . .

The number of grades and products made on the nation's paper and board machines range well up into thousands. Some 3,000 kinds of paper or board are defined in the industry's book of definitions, each of which vary in physical and technical characteristics adapted to specific end-use requirements.

The uses of paper and board range the whole gamut of industrial and cultural activities in the United States. Principally, however, they fall into seven broad divisions, each of which is a cornerstone of or an essential part in the services necessary to American life and its preservation.

Paper is the medium for printing, education, communications information and culture;

Paperboard is one of the most important shipping container materials used for almost every type of product;

Paper and paperboard are the chief materials used for unit packaging of food and many industrial products on high-speed automatic machines and are, consequently, absolutely essential to the mass production and distribution of the durable and nondurable goods industries;

Paper is the source of office supplies upon which business, education, and government depend;

Paper furnishes a host of products for personal hygiene and sanitation;

Paper and board supply a constantly increasing tonnage of industrial component materials to other manufacturing industries;

Building papers and building boards are essential in both military and civilian construction.

Woodpulp, in addition to being the principal raw material for paper and board, is widely used in the manufacture of rayon, cellophane, plastics, lacquers, propellants, and explosives, all of which are key materials in a war effort. The nitrating pulp requirements for defense purposes are an important factor to be considered in the pulp field as they would, in time of mobilization, increase materially over peace-time levels.

Most producers of end products important to the national defense are inescapably reliant upon a long chain of suppliers and sub-suppliers. The fact that the products of these suppliers are often not easily distinguishable in the end product makes them no less indispensable to the nation's survival. This is certainly true of many of the fruits of our industry's production facilities.

This association can do much to stimulate a posture of readiness on the part of every company in our industry. Every company in this industry should have a comprehensive plan for the continuity of its production and management—a plan well suited to its own peculiar circumstances.

Every company important to the security of our country has a responsibility to its shareholders, employes, suppliers, customers and the country at large to do those minimum things, at least, that would facilitate, if not actually assure, the continuity of its operations.

The Business and Defense Services Administration can assist in many ways, acting as a clearinghouse of ideas and offering suggestions based upon the sound and practical experience of other companies in many diverse industries.

So, let's watch our "posture"—both industry and government. For unless we do we may one day wish we had.

Pulpwood Industry Went to War . . .
Typical wartime poster points out vital defense products made by this industry.

MAINTENANCE COSTS REDUCED 50%

American's DiesELectric System Eliminates Over 50 Parts in Travel Mechanism

Three electric units in American DiesELectric Locomotive Cranes—a generator and two traction motors—replace scores of travel parts! American's patented DiesELectric* system delivers smooth, steady electric power to the driving wheels—economical, efficient diesel power to the machinery deck! Elimination of more than 50 travel parts—gears, shafts, clutches, bearings—cuts total upkeep cost as much as 50%! American DiesELectric cranes, designed from the rails up for this great power team, pay for themselves in a very few years!

Speed up pulpwood handling with American's trigger-fast air controls—cut operating expense with modern American DiesELectric Locomotive Cranes in capacities from 25 tons on up!

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

*U. S. Patent No. 2083460

Stepping Up

Production

Per Man Day

PARTICIPANTS IN SECOND SESSION: Discussions were led by Chairmen of Technical Committees (from left) LESTER POLLARD, Minnesota & Ontario Paper Co.; T. G. HARRIS, Halifax Paper Co.; ART BENNETT, Armstrong Forest Co.; R. D. COLEMAN, JR., Champion Paper & Fibre Co.; and Speaker TOM A. WALBRIDGE, JR., Bowaters Southern Paper Corp.

What Price Further Mechanization?

Pros and cons of present woods mechanization considered; costs of future developments in mechanization are weighed

By T. A. WALBRIDGE Jr.
Bowaters Southern Paper Corp.

• Almost every day, in our industry, a plan of mechanization is analyzed for adoption. The general procedure is to assume that its main advantage is increased efficiency, and then to work out a cost comparison to see whether its inception will result in reduced costs. All of us, I am sure, agree that proper application of machinery affords the advantage of increased efficiency, but I, for one, cannot agree that reduced costs should be a limitation. The acid test of any plan of mechanization should be whether or not the application will result in increased costs.

If then, a plan of mechanization affords no direct savings, what are the advantages that make it worthwhile, and if increased costs are not indicated, what other factors might be limitations?

As a means of answering these questions, I am going to consider individually the woods worker, the producer, the woods organization, our present degree of mechanization, and last—but not least—future possibilities of increased mechanization.

Advantages and Limitations of Mechanization

To Individual Woods Worker . . .

For the individual woods worker, mechanization is a pretty straightforward proposition. He can either produce the same with less effort, or produce more with the same effort. Either choice offers an advantage to him.

If he produces the same with less effort, his normal working life may be extended. If he produces more with the same effort, he stands to increase his earnings and better his lot in life.

Mechanization offers the chance to step up in life; to become an operator and gain prestige among his fellow workers.

Most men like machines; the ability to operate them is something to be proud of, and in today's world, the mechanized way of doing things is considered by every one to be the most intelligent way of doing a job.

These advantages to the worker are not without their limitations. Any machine requires care and correct use to be successful. This requires the ability to attain the skills of maintenance and operation, which are beyond the capabilities of some men.

How many saw the power saw ridiculed, misused and cast aside until the old hand sawyers started to team up with the youngsters who could keep one of the things running? Acceptance of any machine in the woods by the worker is going to be subject to the same thing—if he won't accept the responsibility of caring for it and using it effectively, it will find limited application regardless of its virtues.

To the Producer and Contractor . . .

The mechanized producer can usually attract and hold a better class of labor. For him, mechanization offers the opportunity of producing more with less men. Machines are more easily supervised than men, and the increased efficiency brought about by machines allows him to pay better wages to fewer but better trained and more easily supervised workers.

A properly mechanized producer should be able to offer more stable employment, and an increased operating year. The producer then stands to be better rewarded for his managerial ability and capital investment.

These advantages, however, are subject to rather serious limitations. In the South for example, the presence of scattered stands, and light cuts per acre, with relatively no assurance of stumpage ahead, puts mechanization other than a power saw and a bobtail truck, in the realm of near impossibility. Let's look at some typical cost figures:

Stumpage	$4.25
Felling, Bucking & Trimming	4.50
Loading and Hauling	4.00
Total Cost	$12.75

If wood brings $13.50 f.o.b. railhead, the producer has 75¢ per cord, above costs, for profit and risk, managerial ability, and capital investment. What should he skid with?

To go one step further, mechanization of farmer producers may have the limitation of no advantages–for example: If a farmer has several sons, a farm truck, a mule or a tractor to skid with and a power saw, he is in business. He is not subject to the Fair Labor Standards Act; he pays no withholding, no compensation and no fringe benefits. If he cuts the wood on his own land, he pays no stumpage. He usually cuts wood when he has nothing better to do, and he was coming to town on Saturday anyway. What possible advantages can mechanization offer him?

In addition to the limitations just pointed out, the secret to successful operation of machinery lies in having efficient maintenance and repair facilities. These types of facilities do not come easily or inexpensively. This requirement alone might well be responsible for a producer limiting his mechanization to the barest essentials.

To the Woods Organization . . .

So much for the worker, and the producer; what about the advantages and limitations to the woods organizations? Mechanization in general offers the total advantages gained by the individual workers and the producers. These add up to a more stable labor force, and more efficient and permanent producers. It gives us a greater chance to meet increasing demands for wood in the face of a decreasing labor supply.

Our organizations are, however, subject to rather different limitations of mechanization than the worker and producer.

One rather recent but serious limitation is appearing in some public and large private sales of stumpage which stipulate that crawler tractors are not to be used in harvesting.

Some companies are practicing sawlog forestry in conjunction with their pulpwood stands, thus requiring thinning on all areas. This puts the producer in the position of having to operate over large areas, on light cuts, under restricted operating conditions. He can never look forward to heavy volumes on concentrated areas afforded by clear cutting, which as we all know offer the greatest advantage to the mechanized operator.

The most serious and long suffered limitation to all of us, however, is the double standard of costs that prevail between the mills and woods operations. If we could afford the same level of wages, engineering development costs, and operation and maintenance standards that are usual in paper mill operation, I am sure that our present degree of mechanization would be as antiquated as the Holt tractor. If woods mechanization is to keep pace with mill development, these discrepancies must be eliminated to a greater degree.

His Mechanization is Limited . . .
The producer operating on small tracts and light cuts must limit his mechanization to barest essentials.

Present Degree of Mechanization

Now that we have reviewed the advantages and limitations of mechanization at its various levels, let's take a look at our present degree of mechanization. Over the entire industry we are actually more highly mechanized than many people would believe.

Felling and bucking is largely done with power saws. In many areas, truck loading is at least partially mechanized. Hauling is well mechanized, and at the delivery point, unloading is almost 100% mechanized. The weakest link, of course, is our prehauling systems.

A quick run-down like this causes one to wonder why we should be concerned about mechanization, but a closer look brings out a significant point. Except for the power saw, all of our mechanization is the result of fitting relatively expensive basic machines with attachments and accessories for a specific job. Their only justification lies in the fact that they can be applied to heavy concentrations of wood on a sustained use basis.

One of the best examples is the lift-truck. These machines can only be applied economically to certain expected volumes of incoming wood, and only competition for wood in certain locations will justify their use when incoming volumes fall below this point.

This one fact explains the lack of mechanization wherever and whenever it appears. It also explains why our present degree of mechanization is built around basic machines, since further mechanization under present conditions of operation is not likely to afford application to either large concentrations of wood or sustained use at any one locality.

Further Mechanization . . .

What of future or further mechanization? We have already mechanized those phases where high volumes and sustained use make it economically feasible. Millions of dollars are being spent annually to increase the efficiency of these basic machines. The phases of production which are now unmechanized are going to be the most difficult both from the standpoint

of the machinery manufacturer and the contractor or producer.

The manufacturer will be faced with the problem of producing "custom" machines to meet the special requirements of a myriad of local conditions. The producer will be faced with the constant need to adapt these "custom" machines by further modifications. Such machines must be inexpensive, operator proof, mobile, and capable of infinite variations of application.

Any large manufacturer is understandably wary of such a product, and will probably not attempt to enter such a doubtful and unrewarding market. The producer, who faces a set price for wood delivered f.o.b. yard, has no capital for the experimental development of specialized machines, and can only mechanize with proven equipment, and that must be within his financial reach.

These facts paint a rather discouraging picture, and explain rather simply why further mechanization will be slow and one of our most frustrating problems. In my opinion, the problem lies squarely on the woods organizations. All of our recent analyses point to increasing demands for pulpwood, and a decreasing labor supply. The solution is up to us. The woods organization of every mill should be building and testing experimental attachments, accessories and machines.

In addition to this experimental logging program, there are several other possible ways in which woods organizations can increase the present degree of mechanization. One of the most promising is the possibility of relieving the producer of some of his present responsibilities.

As company lands come into maturity and concentrated volumes become available for harvesting, it is entirely possible the producer will only be required to fell, buck and skid to the road. Company units offering reduced costs on long hauls can be organized to deliver the wood to the mill.

Aside from the economy an organized hauling program might afford, many of the junk trucks, now delivering wood could be kept off the roads. Many of us are feeling pressure, from a public relations standpoint, concerning the safety of these trucks. That they are a hazard, is verified by recent legislation in two of our Southern states, requiring additional binders on the load.

We could do much to push the use of easily attached and relatively inexpensive steel racks for such trucks which would not only make them safer, but would contribute immeasurably to the appearance of the entire outfit as they move through the front gates of a beautifully engineered mill. There really should be a back door for them to come into in their present condition.

Another possibility is for us to go farther into the woods and only require our producers to fell and buck, or to fell and skid log lengths. Company skidding units, or in-the-woods chippers could take over from there. That such mechanization will come, is certain. Certainly we cannot afford to get too far ahead, but woe to us who lag behind.

Conclusion . . .

In conclusion then, let me summarize the advantages and limitations of mechanization in this way:

1. If mechanization will afford the advantages of a more stable labor force and more efficient producers at no increase in costs, then it is justified and desirable.

2. If basic machines of high initial cost can be applied to large volumes on a sustained operation basis, there is no limitation to their application if increased costs do not result.

3. Lastly, if further mechanization is to take place, it will be largely through the efforts of our participation in a program of financing, building and testing experimental machines. We cannot expect the machinery manufacturers, or the producer, to enter this field actively enough to solve the problem of producing more wood with less men. This is our problem to accept and solve—to paraphrase a popular safety slogan—"The wood we get may be our own."

Heavy Volume Permits High-cost Mechanization . . .

Basic machines adapted to specialized jobs, such as the loader shown, require heavy volumes and sustained use to justify their high initial cost.

How Skid-Grapple gives you production-line woods efficiency!

Get into an International crawler's rubber-padded seat, press the starter button, and you're on your way to greater pulpwood profits! Turn on the power and *simply push* the lower arms of the International Drott Skid-Grapple into the woodpile. As soon as a grapple-load is in grabbing position, use fingertip control to clamp onto the wood securely with the *exclusive* top grab-arm.

Then apply *exclusive* triple-power pry-over-shoe break-out action—and you wrench loose even frozen-down or mudded-in pulpwood, without any peavey-prying or other handwork, whatsoever!

Use famous International Drott-developed ground level rollback to bring the load close to the tractor, improve balance, provide "see-all" visibility, make transport easier.

With an International Drott Skid-Grapple you have the *traction* and *break-out action* to load big cordage anywhere, in any weather. *And from the time cutters stack your pulpwood on strip-road or at the stump, you don't touch it by hand!*

Prove you can save $1.00 or more in labor costs per cord with a Skid-Grapple and get production-line efficiency. See how you get a multiple-duty road-builder—by switching a Skid-Grapple with a Four-In-One, or Skid-Shovel bucket or Bull-angledozer blade. *Compare* exclusive shock-swallowing Hydro-Spring advantages. See your International Drott distributor for a Skid-Grapple demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
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See how the Skid-Grapple's exclusive top grab-arm aids in obtaining a big load—and providing positive load-control! Shown is the International TD-6 equipped with pulpwood Skid-Grapple—increasing efficiency for a South Carolina pulpwood contractor.

Using semi-skid transport on big, heavy-duty Skid-Shoes lets you transport full grapple-loads with exceptional ease and speed. Impact forces of rough-ground travel are gentled 67%, or more, by exclusive, shock-swallowing Hydro-Spring!

You pile high into trucks or onto piles—use selective dumping control, to release logs one by one, or all at once. Top grab-arm is controlled by third valve of hydraulic system—which can also be used to control rear-mounted road-working equipment.

Forest Site Classification, Preparation, and Improvement

CHAIRMAN AND SPEAKERS AT THIRD SESSION: Left to right are TED W. EARLE, Gair Woodlands Corp.; KENNETH P. DAVIS, University of Michigan; T. E. MAKI, School of Forestry, North Carolina State College, and CHARLES E. KELLOGG, Soil Conservation Service, U.S. Dept. of Agriculture.

How Soil Management Aids Growth

What soil is, and how knowledge of it is related to good forest development and control methods

By CHARLES E. KELLOGG
Soil Conservation Service
U.S. Dept. of Agriculture

● Efficient tree production, like efficient field crop production, results from management applied to the soil.

Where the natural landscape has forest trees, timber products can be produced at least once by simply harvesting the trees already there. In our country virgin forests have almost vanished. For most of our wood crops we are now concerned with management practices for producing the trees —combinations of seeding, planting, pruning, weeding, disease and insect control, fire protection, and all the rest.

Formerly we accepted our natural forests and took what was there. Generally, we did the same with our second-growth forests. We learned what kinds of trees follow cutting, cutting and fire, and the abandonment of plowed land. For a time some of our forest ecologists were almost bound to their own knowledge of plant succession. Now we know that there are no necessary virtues in the successions themselves, and that we can alter them to our advantage. Sometimes we even need to control the succession to prevent the climax from coming in. The deadening of hardwoods in southern pine stands is a good example.

Modern forestry or tree farming is fast becoming more and more like modern crop farming and we are increasingly able to manage the soil to get high production of wood products. The heart of the matter is the adjustment of our practices to the soil, partly to change the soil and partly to choose our plants and practices to take full advantage of the soil that we have.

Under intensive agriculture we often change the soil a great deal. For example, some of our most productive soils for cultivated crops are wholly unsuitable for farming in their native condition; but through combinations of practices we have changed these soils and made them highly productive.

Perhaps in most present forest management, we mainly select practices to fit tree types. Yet many select the tree types and practices to fit the kind of soil. But we need to go even further. As time goes on forest managers will increasingly adopt practices to change the soils and make them more suitable for high production of the most valuable species. Drainage, runoff and erosion control, fertilization, and liming are obvious examples. We now have far better machines and far better chemicals to accomplish these objectives than we had only 25 years ago. And we have better markets to make such practices pay.

History of Soil Surveys . . .

The Soil Survey has, I believe, a useful role in long-time economic forest production on a sustained yield basis. Organized soil surveys began in the United States in 1899. Before that time farmers knew that they had contrasting kinds of soil with different qualities for plant production. Scientific study had shown that unlike soils were formed in different ways. But still in 1899 no one had clear ideas of what soils really were, how they were formed, or how they should be classified. Especially did no one appreciate the enormous variety of kinds of soil that we have.

Fortunately, the early soil scientists did not appreciate their scientific predicament, otherwise they might not have started at all. Too little was known about soils in 1899 for good soil classification; but the only way to learn about soils was to study them, classify them, and map them. Thus the history of the Soil Survey has been one of trial, test, improvement, and further trial, test, and improvement. Principles learned were applied and the applications led to new prob-

lems, more research, and better principles.

Nevertheless, the practical objective of the Soil Survey during this whole period has remained essentially the same: (1) To define soils in terms of those combinations of characteristics that indicate their genesis and that are significant to their capabilities for producing adapted crops, grasses, and trees under alternative systems of management; (2) to classify them and to give them names according to a uniform nationwide system of classification; and (3) to interpret them according to their potential productivity at the current levels of the agricultural arts.

Making full use of our growing knowledge about soils required increasing accuracy and completeness of both definitions and interpretations of the soils shown on the maps. Improvements resulted from research in both field and laboratory. Thus the soil surveys published by the U.S. Dept. of Agriculture over the years have generally increased in detail and accuracy.

This development of our modern soil survey represents I believe, one of the best examples of scientific cooperation among many people, and especially between the USDA and the state agricultural experiment stations. Other state, federal, and private agencies have worked with us also. All reliable research results obtained in the field and laboratory are helpful to the interpretation of soil surveys and helpful in deciding where the boundaries should be drawn between different kinds of soil.

We also cooperate with soil scientists in other countries through exchanges of soil descriptions, methods, and results.

Whenever the results of research and experience on a defined and named kind of soil can be accurately described, the results contribute to our understanding of that soil wherever we find it. Thus it is that soil classification and soil maps make the bridge between our research, experiments, and trials, on the one hand, and specific tracts of land, on the other.

What is Soil? . . .

Perhaps I should explain what we mean by "one kind of soil." Soil covers the earth as a continuum. But the word "soil" in this sense is a collective of all the many thousand kinds of soil, just as the word "vegetation" means a collection of all kinds of plants. By one kind of soil I mean a soil with a unique combination of characteristics that sets it apart from any other kind of soil in the world. The number of these characteristics in the various combinations is exceedingly large, and each characteristic varies through several significant steps.

Thus "a" soil is a specific natural body on the surface of the earth. It has shape, area, and depth. At any point within this body a vertical section starting at the surface, where biological and climatic forces have their greatest influence, down to the limit of biological influences, shows a soil to be made up of layers, or soil horizons. Depending on the kind of soil, these horizons may contrast slightly or greatly from one another.

The whole vertical section, including all the horizons, is called the soil profile, which is defined in terms of the thickness, structure, texture, and other physical, chemical, and biological characteristics of the soil horizons. These bodies or areas of soils having similar characteristics—similar profiles, slopes, and so on—are said to be one kind of soil. Thus a kind of soil is analogous to a kind of plant, such as "white pine."

Within any one kind of soil, no two profiles are completely identical, but our definitions of kinds of soil permit them to vary only within defined limits. These limits are set in terms of what we know from experience and research about the significance of individual soil characteristics within the various combinations. We assess the significance of characteristics in two ways: (1) On the known capabilities and responses to management of the soil; and (2) on the genesis of the soil as a function of its environment.

Usually these two sets of considerations go together. That is, soils formed differently usually respond differently to management practices. Some pairs of soils vary significantly genetically, yet seem to have similar capabilities for use. But the history of soil research shows that the significance of a genetic difference usually appears in practice sooner or later. Thus basic soil descriptions are essential not only to present interpretations but also to future interpretations under different economic conditions and with new technology.

Classification of Soils . . .

Like other natural objects, various levels of classification of soils are recognized. In dealing with the soils of the world as a whole, let us say for comparing the soil potentialities of great regions or continents, soils are defined very broadly, just as we speak broadly of northern conifers or southern hardwoods. But for giving specific guidance in individual farm plans, where it is necessary to synthesize all experiences that influence both soil use and management practices, soils are defined within narrow limits—narrow enough for quantitative predictions of the yields resulting from alternative combinations of practices.

Although some soils may vary from one another in only a few features, or even in only one, such as slope, depth, or stoniness, it must be emphasized that each kind of soil is a defined combination of a whole host of characteristics. Within an ordinary American county, all of the soils have many characteristics in common and most of the differences between them can be related to local differences in parent rock, in relief, or in the age of the land forms. Yet, if we compare the soils of Virginia with those of South Dakota, we find that the most important differences result from the different influences of climate and native vegetation.

In the detailed soil survey used in farm and ranch planning, the kinds of soil are classified as phases of soil types within series. Although a soil type is a homogeneous unit in the natural landscape, the soil types are subdivided into phases where differences significant to their use and behavior under culture need to be recognized for accurate predictions. Thus we have phases of a soil type, such as Miami silt loam, according to differences in slope, erosion, or stoniness that are important to soil use and management although not to the behavior of the natural soil.[1]

A soil area shown on the soil map that contains 85% or more of one kind of soil is named according to the name of that kind of soil. Where the pattern of soils is complex, some of the areas shown on the map contain two or more kinds of soil, and are given combined names.

This concept of a soil association is comparable to the concept of plant association. In both instances, two or more kinds are placed together not because they are similar but because they are intimately associated together and cannot be shown separately on a map. As the scale of mapping becomes smaller, more areas on the soil map are associations and have such combined names.

Since small-scale maps are commonly made of mountains and other land suitable for only extensive uses, I should like to emphasize this point. The kinds of soil in such compound areas, or soil associations, are commonly very contrasting. The soil map tells the forester, for example, that in a soil association area he may expect two or more kinds of soil, from the

[1] See *Soil Survey Manual*. Agricultural Handbook No. 18. U.S. Dept. of Agriculture. 1951.

descriptions in the soil survey text he can learn to differentiate among these as he walks over the ground.

Interpreting Soil Surveys . . .

A basic or standard soil survey includes a map showing the boundaries between the kinds of soil, together with precise statements of the combinations of characteristics that define each kind of soil.

Interpretations are made to indicate the capabilities of the soils for use, the adapted plants, estimated yields, and opportunities and limitations for various management practices. Thus the interpretations depend not only on the qualities of the soil but also on the current state of the management arts and the current economic outlook.

Perhaps the two most important interpretations to forest managers are, for each kind of soil, the relative adaptability of tree species and the rates of growth of each. Commonly these interpretations are expressed by a number—a site index for each species.

With those species for which research has established the quantitative relationships between tree growth, age, and measurable features of representative trees in typical stands, over a wide range of conditions, the site indices of kinds of soil can be established by careful field work, especially the location of typical stands for measurement in plots that represent the normal or modal definition of an important kind of soil. Plots need to be large enough to avoid the effects of outside influences of vegetation or water relations on other kinds of soil.

With indices established for the major kinds of soil over the whole range of soil characteristics, the site indices of the intermediate soils can be estimated.

Forest-Site Indices . . .

Following this general method, dependable forest-site indices are becoming available for many soils, especially for the important conifers. In several states we have preliminary ratings of our principal soils according to site indices or site classes. Precise indices for hardwoods are not yet available, although general site classes can be fairly well estimated in many places to give at least a "common sense" comparison among species. That is, we can now judge for many soils the relative volume of growth for say, tulip poplar, gum, and one or more species of pine.

With the conifers our principal objective at the moment is to step up the number of field-plot measures on more and more kinds of soil that have important potential use for forest trees. With the hardwoods we need further work to discover suitable methods for obtaining more nearly quantitative values of site indices.

Experience shows clearly that the development of these indices will be extremely valuable to landowners. With these interpretations and an accurate soil survey in hand it is possible for land operators to know which species are best adapted to their soils and to estimate the probable harvest in relation to inputs in forest management.

Parenthetically, I believe now we have gone beyond the old idea that any soil not suitable for commercial crop production but that will grow trees is suitable for commercial forestry. Unfortunately, we have many soils in this country that do not produce either field crops or tree crops economically with the known management arts. Such soils should be protected by woody growth to prevent damage to other more valuable land, but we cannot expect to recover management inputs in commercial forestry.

Thus, we can rate the soils according to the expected tree crop just as we have been doing earlier for field crops. Besides comparing the expected yields from different species of trees we can compare the expected income from trees with that from other crops.

Need More than Rating . . .

So far we have talked about one rating for each tree species for each kind of soil under current simple management. These ratings still need to be completed for many kinds of soil. But these ratings will not be enough, any more than such simple ratings were enough for interpreting the soil survey for predicting field crop production. Researches by both public and private forestry institutions have shown that soil management practices can increase the efficiency of tree production along similar lines that have been so dramatic with food crops in recent years.

We need more than one rating according to differences in the intensity of management. Already some interesting experience has been had with soil drainage in forestry. Even relatively simple drainage, combined perhaps with the construction of access roads, can change the site index very greatly.

Personally, I believe that we shall see the wider use of lime and fertilizers, especially with pure pine stand on the acid soils of low nutrient status in the South. Were it not for the fact that fertilizers and lime are abundant and easily applied, I should be inclined to worry about the long-time effects of pure pine stands on some of our soils.

Even where soil fertility can be sustained more easily under mixed stands than under pure pine, it may be more economic to use fertilizers and lime with pure pine stands. Under some conditions we may want to break up the pine stands with strips of hardwood to help control pests and fire. Although arbitrary strips can be laid

There's More to Soil Here Than Meets the Eye . . .
This is Allegheny forest region in central Pennsylvania. Dig down about 12 to 18 inches and you hit hard pan—a hard clay substance which presents drainage problems and in time of heavy ice or windstorms results in many overthrown trees because of shallow root structures. Advantage is that hard pan presents good surface for road networks, providing easy access to forest sites.

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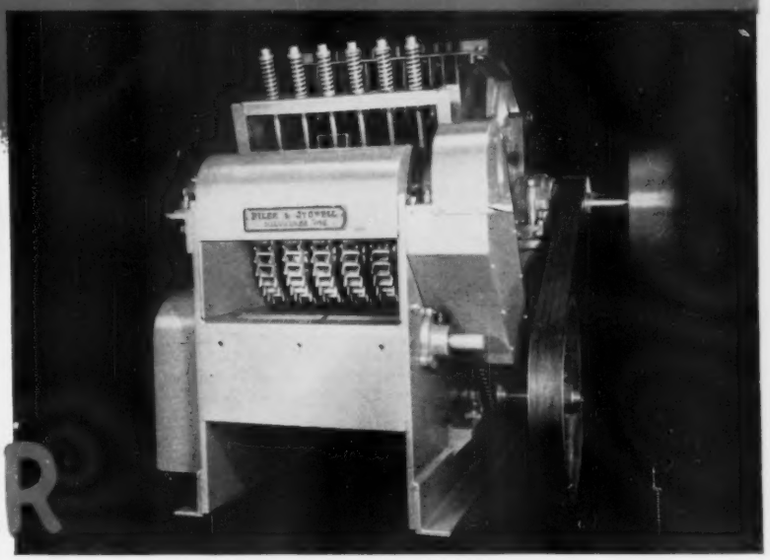

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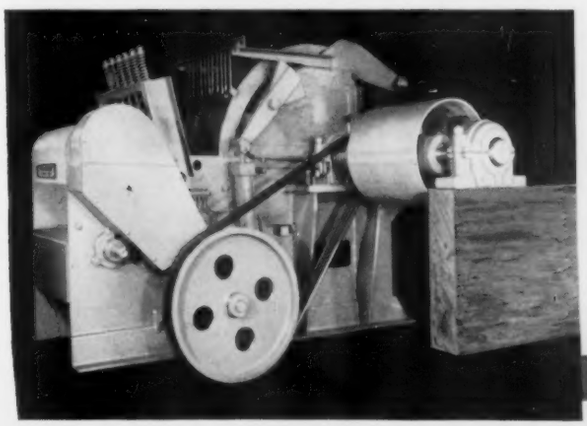

Converts sawmill waste to high-grade, uniform size pulp chips at the rate of 10 cords per hour! Contains features that sawmill operators have long wanted, such as: *Large opening designed for refuse; Simple installation; Controlled horizontal feed; Automatic clearing cylinder; Individually hung pressure fingers which follow contour of the knives holding the ends of the stock being chipped.* Discharge is either through bottom or at rear as desired. Available in different sizes.

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out, it is often practicable to select out the soils best for hardwoods and thus follow the natural soil boundaries in the layout of commercial forest types.

Other Survey Results . . .

With our study of forest growth and management many other relationships besides site-index are becoming clearer. I should like to mention some of these as examples:

The spread and severity of the little-leaf disease of shortleaf pine is related to the kind of soil. Similar relations are suspected by some with other tree diseases.

The rate of brush encroachment following harvest cutting varies widely with the kind of soil.

The survival of planted trees varies with kind of soil and management. On certain soils we have seen amazing differences with even light mulches.

Losses from windthrow are related to kind of soil, especially to the several soil features that influence the depth of rooting and the stability of the upper layers of soil.

It is much easier to build and maintain roads and trails on some soils than others. Because of their differences in physical properties, the serious erosion sometimes connected with skid trails and roads presents quite dissimilar hazards when encountered on different soils.

The fact that some soils are easily compacted and lose their permeability is important to tree growth.

As we enlarge our concern to the effects of different forest management systems on stream flow, ground water recharge, and water yield, a whole group of soil properties, defined by the kind of soil, becomes critical.

Soil-Management Relationship . . .

Again I should like to emphasize that our harvest, be it trees or field crops, depends on both soil and management. As the management becomes increasingly intense, in one sense the kind of soil exerts a greater influence and in another sense a lesser influence.

The kind of soil becomes increasingly critical to the adjustment of management practices; that is, to be efficient we make more variations in combinations of practices from place to place.

Yet in any place, the percentage of the total harvest per man-day-acre related to inputs of labor and capital increases and the percentage related to land alone decreases. As the inputs of capital and labor increase per acre, skillful managers make more use of soil surveys to adjust their practices to fit the unique capabilities of areas of specific kinds of soil.

The relative advantage of our thousands of kinds of soil for both trees and crops of all kinds may change greatly as new technology develops and goes into use. In many communities soils thought to be the best for field crops a few years ago are now being used for trees. Other soils thought to be fit only for trees are now being used for intensive pastures and other field crops. Such shifts in relative advantage will increase. Thus, both private interests and the public interest in having the best use of our soil resources will call for changes.

Especially as we visualize the demands of an increasing population for food, timber, and fiber, to say nothing of possible emergency demands like those of the early 1940's, it is clear that we cannot "fix" the land-use pattern on many marginal soils. Acres that serve the public interest best by being in trees today may be needed for food crops 10 or 20 years hence. And some of our present-day fields may be best used for trees in the years ahead.

I have hope that neither tree farmers nor other farmers become fixed in their ideas about soil use. To achieve the twin goals of conservation and efficient use we must be prepared to adjust to the inevitable march of improved soil technology.

What Does Site Preparation Cost?

How to make meaningful financial evaluations for land work done now in expectation of future increased yields

By KENNETH P. DAVIS
University of Michigan

● Interest in the financial appraisal of site preparation investments is most specific and conclusive evidence that the pulpwood industry is in the timber-growing business for keeps. I am old enough to have witnessed much of the deep transition from mostly talking about forestry to its increasingly intensive practice.

I can well remember from student days of thirty years ago—and for a good many years thereafter—of hearing people say how fine it would be *if* there was a vigorous and well-established forest industry, *if* tree growing was accepted as a common topic for discussion by foresters as farmers talk about their crops, and *if* the various valuation procedures forestry professors like to spin compound interest webs about became a vital topic to be critically examined by businessmen making such investments.

Well—here it is. These things have come to pass and I'm on the carpet, as it were, to discuss financial appraisal of various kinds of site preparation work now being done by the industry. The purpose is not to examine the many good reasons why industry needs to get greater production from owned lands, nor to probe the efficacy of specific procedures employed. This has been well covered by technical committees.

The subject to be considered is, in basic terms, how to evaluate most meaningfully investments for site preparation made now in expectation of increased yields at some future date. This is an exceedingly common type of problem encountered in both private and public enterprise. Fundamentally, it is a problem of economic justification and should be viewed with due respect. There are no simple or single answers.

As in any appraisal problem, there are several aspects to consider:

1. The point of view and purpose,
2. The identification and measurement of pertinent values involved,
3. The method or methods most significant and useful to employ.

Regarding viewpoint, for valuation to be meaningful, it must be done for a purpose, clearly defined. There is no such thing as a disembodied value floating around the abstract. The question is always value to whom and for what purpose.

Two Budget Aspects . . .

Two related purposes seem particularly pertinent. The first is how to spend a given budget for site preparation most effectively. The second is how to support the need for a continued or increased budget. The first is essentially an internal problem of woodland administration. The objective is increased pulpwood production and the problem is to compare alternative methods of getting it.

The second purpose, to support or increase a site preparation budget, is a problem of being intelligible to executives who have to weigh woodland budgets against other corporate expenditures. The same information is involved but it has to be presented in terms that permit comparisons with widely different kinds of expenditures. This comes closer to direct economic justification, at least within the framework of corporate interest.

As to the second general aspect of appraisals, value identification and measurement, the problem is to determine costs and returns. Costs are not so difficult, though from my limited experience with cost accounting it is harder than often appreciated to isolate costs accurately and to be sure you have the full cost picture. But at least they are based on known physical facts, and can be determined with reasonable certainty.

Returns are much harder to determine. They can only be estimates of yields to be received many years in the future. It is necessary not only to determine physical returns in terms of increased wood production, but often to estimate in value units as well.

Rather obviously, costs and returns cannot be compared without having both. The latter is the weak spot. We rather flounder here and for good reason; we often just don't know enough to do otherwise. But flounder we must, if necessary, and I feel we are often too hesitant to make the plunge and wade through to the other side.

Working close to the problem, as foresters do, it is easy to not give full weight both to the necessity and the real possibilities of making reasonably accurate estimates of future returns. The plunge really isn't so bad if we put our minds to it.

The third aspect, method of appraisal, is the focus of interest in this discussion. Assuming you know costs and can make reasonable estimates of returns at some future date, the question is how to compare them. Let me spread out possible approaches briefly and then discuss them comparatively.

Will Improved Yield Justify Investment? . . .

Cost of any site improvement must be balanced against future increased yield. Here are two views of relatively new method of "chaining" to clear land prior to planting. At top, heavy (50 lbs. per ft.) anchor chain, attached to two tractors, is dragged through woods. Note stump "erupting" as chain tears it out of ground. Bottom, same area 12 minutes later, as tractors return, cutting roots and finishing job.

The more or less traditional approach is to compare present costs with future values by using an interest rate to adjust for the difference in time. The future is always discounted to some degree; we recognize that dollars received at some future date are not worth an equal number of dollars today. Employing an interest rate adjudged to be meaningful in the context of the problem provides a specific means for measuring the importance of the passage of time and at least seems properly businesslike.

A simple case, that well illustrates the use of interest, is to consider a single investment made now in expectation of a single future return directly resulting from it. In terms of site preparation problems, this means comparing a cost for discing, stripping, hardwood reduction or similar operation to the value of the *increase* in yield directly resulting from it.

This increase can be thought of in two ways; first, as obtaining more yield over a set period of time, as an established rotation, and second as getting the same or similar yield sooner. Stand improvement work is often done to buy time, to permit a commercial pulpwood thinning sooner. In either case, net harvestable growth is increased; it is just a question of when it is realized.

In either situation it is also necessary to assume that cause and effect can be specifically isolated; that fire protection, taxes, administration and other area and time costs will be continued whether or not a particular site preparation cost is incurred. This is not always true, but assume it here. To provide a convenient framework, especially applicable in the South, further assume even-aged management on a 30-year rotation.

	Return or cost per acre	Return or cost per cord	Present value discounted at 5%	Future value at 5%
Additional yield 30 years hence (10 cords @ $5 per cord)	$50	—	$11.57	$50.00
Cost of site preparation	$10	$1	10.00	43.22
Net gain	$40	$4	1.57	6.78

On this basis, comparison of some illustrative cost and return figures is as shown above:

It makes no difference whatever whether one discounts to the present or accumulates to the future so far as the comparison goes; the $1.57 is the discounted value of $6.78. The choice depends only on whether one is interested in making comparisons on the basis of present or future values. Either basis is equally valid; the present is usually preferred because that's when we live.

The same sort of analysis can be made if, as is often the case, several costs and returns occurring at different points in time are involved. The problem then is to compare different *schedules* of production. Cost and return items should be consistently accumulated either to some major harvest date in the future, or all discounted to the present. (Calculations of this sort are given in full arithmetical detail in the second part of my book *American Forest Management*.)

Continuous Functions . . .

One can get as many answers from such calculations as there are significant combinations of assumptions. In fact, it is important to recognize that one is dealing with more or less continuous production functions. Instead of considering only a few possible alternatives, it is possible to work out a series of input and output curves (or equations) to solve for most any combination. I would like to work in an area to obtain cost and return data permitting development of such a solution.

An alternative approach employing interest is to solve for a rate instead of assuming one. This avoids the always difficult problem of determining a meaningful rate and interpreting just what the "net gain" really signifies. In the above illustration, $10 brings $50 in 30 years. This means that 10 times an interest factor equals 50. In simple equation form:

$$10(1+p)^{30} = 50$$
$$(1+p)^{30} = 50/10 \text{ or } 5 \text{ (the interest factor)}$$
$$p = 5.5\% \text{ (reading from a compound interest table)}$$

When several costs and returns are involved, solving for the rate is more difficult but it can be done. Cut and dry methods are usually the easiest. The problem is to find an interest factor and corresponding rate that equates costs and returns over the time period involved.

My own feeling is that interest problems of this sort can often most helpfully be framed to solve for the rate. Doing so permits making consistent comparisons based on a single figure, a rate.

Benefit/Cost Ratios . . .

Closely related to the approach of determining the rate is use of benefit/cost ratios. They are widely employed in comparative appraisal in both public and private enterprise. They can be used both with and without inclusion of interest. In the illustration given, the ratio, without consideration of the time element, is 50/10 or 5.

So long as the time period is the same, it makes no difference, relatively, whether interest is considered or not. For example, and again using a 30-year period, $5 stumpage, a $10 cost and a 5% rate, consider benefit/cost ratios of 5 and 8. The latter assumes an increased production of 16 cords worth $80. Discounted equivalents are

$$\text{For a ratio of 5,} = \frac{\$50/4.322}{10} = \frac{5}{4..322} = 1.16$$

$$\text{For a ratio of 8,} = \frac{\$80/4.332}{10} = \frac{8}{4.322} = 1.85$$

The comparison between 1.16 and 1.85 is the same as between 5 and 8, they are in exactly the same proportion.

A variation on the same general pattern of benefit/cost ratios is to compare different methods or production schedules directly on the basis of cords or cubic feet produced per dollar of expenditure or the cost per unit of volume. This again gives exactly the same relative picture. At the risk of tangling you up in arithmetic, let me illustrate. Consider first cords produced per dollar expended. Using the same figures,

$$\frac{10 \text{ cords produced}}{\$10 \text{ cost}} = 1 \text{ cord per dollar of cost,}$$

and 16 cords produced / $10 cost = 1.6 cords per dollar of cost.

Since 1 and 1.6 are in the same proportion as 5 and 8, the comparison is unchanged.

If preferred, the comparison can also be based on the cost per cord, a more familiar figure. In this case.

$$\frac{\$10 \text{ cost}}{10 \text{ cords produced}} = \$1 \text{ per cord}$$

$$\text{and } \frac{\$10 \text{ cost}}{16 \text{ cords produced}} = \$0.625 \text{ per cord.}$$

These ratios are in the same proportion as before except the direction is reversed as cost per cord goes down with increased production.

The discounted equivalents (again in the same ratio) are

$$\frac{1}{4.322} = .2315,$$

$$\text{and } \frac{0.625}{4.322} = .145.$$

Juggling ratios can be a bit confusing, but the useful fact emerges that, to the degree periods and unit values are the same, neither inclusion of interest nor estimation of future unit values affects making direct cost and physical productivity comparisons.

If the unit value of the product changes with alternative site preparation methods, then an estimate of future values obviously must be made. If the time intervals change, interest should be figured in if you are concerned with equating the time element.

Which of these approaches is the best? I think the answer depends on point of view and purpose.

Best for Budget Spending . . .

For the woodland manager concerned with spending an existing budget for site preparation work most effectively, comparison of benefit/cost ratios seems the most direct and meaningful approach.

If the time periods and unit values involved in the comparisons are substantially the same—as long as one is talking in terms of 30-year rotations and fairly consistent cordwood values, for example—, I would skip compound interest and estimation of future dollar values and make comparisons directly in cost per cord produced.

Doing so, focusses attention on the two most fundamental and ascertainable elements in the problem; namely, present costs and best possible estimates of increased future productivity

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What about justifying the need for a continued or increased budget for such work to top management? Here one enters the full realm of business considerations—and I, at least, am partially left behind, certainly being no member of top management. Business decisions are made on broader grounds than benefit-cost calculations. I can only indicate some of these considerations here.

Other Budget Considerations . . .

One major item is the effect of federal corporate income taxation—a most complex subject. Should one divide present costs approximately in two on the assumption that they are expenses, and reduce future returns by a quarter assuming they will be taxed as capital gains with no depletion allowance? It seems to me that questions of this sort must be answered by company management in terms of its own situation.

What about the reality of future dollar value estimates? They are a compound of changes in the value of money (inflationary or deflationary trends), of changes in the real value of the product (as a result of competition), as well as uncertainty regarding the physical basis for the estimate. If the next thirty years brings as much change as did the past thirty, specific value estimates will be uncertain indeed although general trends may be predicted.

What about the significance of interest compounding over as long a period as even thirty years? As I said, it is always difficult to determine the most meaningful rate and to interpret exactly what a net gain over and above an assumed rate means in terms of profit and risk.

A deeper question is whether businessmen really figure that way concerning internal corporate investments like site preparation. Inclusion of interest in such matters is primarily useful to facilitate comparisons. If the comparisons are valid without it, as largely true in this situation, why bother with interest computations? They can raise about as many questions as they answer.

A broader consideration is the present and probable future competitive situation. If more wood is needed and is not grown on company lands, where will it come from? This encompasses more than estimates of future general market prices as land ownership and local procurement competition is involved.

It seems to me that any permanent forestry business, and the pulpwood industry is most certainly in this category, operates essentially on a going concern basis. It has to. That is, costs are incurred, income is received and taxes are paid each year. One certainly plans ahead, acts accordingly, and the current net income stream increases or diminishes with the quality of management and all the external forces that beset it.

But one does not set up a myriad of accounts for individual tracts of land and painstakingly figure interest on them one by one to determine whether a particular investment "paid" at the end of 30 years or so. If one had a fully-regulated forest, cause and effect would be simultaneous in an offsetting sort of way. Site preparation work is done on one acre and the result of it done in past time harvested on another. Interest accumulation just does not enter in since all time periods are in balance.

While few if any forest businesses can ever be on a fully-regulated basis —business life in these United States is not likely to be that static—, an operating approach still seems the most realistic and certainly the simplest assumption to make.

Justification of Differences . . .

If this is accepted, then justification of different site preparation investments can effectively and simply be presented through use of direct benefit/cost ratios, preferably expressing future benefits in terms of physical production. As stated, doing so focusses attention on the basic information the forester can and must furnish.

This follows the sound principle of measuring those things that can be measured as accurately and consistently as possible so that the area of uncertainty can be narrowed to strictly business considerations. Appraising these uncertainties is the specific task of business management.

First emphasis consequently should be placed on efficient site preparation methods, accurate cost determination, and on the application of best mensurational and silvicultural skills to estimate future returns. This last is an area of uncertainty, yet by focussing down on it, estimates of sufficient accuracy can be made.

If cost and returns of alternative methods are well presented, the way is then cleared for direct business appraisal. Given good information of this sort, my feeling is that business executives can interpret it in terms of their tax, capital, and general competitive outlook. How far the forester should go in this direction in presenting recommendations is a question I cannot answer without working for a particular company and knowing how they think and operate.

Forester's Presentation . . .

It would seem to me that a forester's presentation should include a clear analysis of the present and prospective wood procurement situation pointing up the need for increased production from owned lands which represent a large capital investment and continuing protection and administrative costs.

I do not at all wish to give the impression that forest managers should not be concerned with business considerations. My only point is that information that must come from the forest is a first and major necessity that should be squarely met. Along with this is full respect for the complexities of corporate life in a rapidly changing and dynamic situation.

The general prescription suggested here may seem too simple. It may also seem disappointing if a brilliant exposition of compound interest and some golden scheme for evaluating an inherently uncertain future is expected. It is fun to throw compound interest around and it has its uses too. I suspect that to many, valuation courses in school may have seemed something of a black art with interesting if only partially understood possibilities.

But there is no rabbit under the hat, black or otherwise. Financial appraisal of a problem such as this should be regarded as a penetrating sort of problem analysis. It is exceedingly valuable in forcing balanced and full scrutiny of both costs and returns and clear consideration of alternatives.

Unfortunately, however, there is no magic to be distilled from it in reading the future. We must and do have general faith in the general forward movement of the industry. Careful financial appraisal gives a useful and indispensable aid in translating this faith into sound business action.

How to Improve Forest Sites

How artificial soil improvement, drainage and fertilizers may be used to attain peak fertility and productivity

BY T. E. MAKI
School of Forestry
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• Profits from managing forests hinge to an important degree on the productive capacity of land for regeneration and growth of trees. The task of evaluating this capacity, of maintaining it on an acceptably stable basis, and of ultimately improving it is not easy because of the great diversity of soils and sites with which foresters must deal.

Forest soil materials range in character from the relatively thin accumulations of organic matter resting on rock, as, for example, on the Laurentian peneplain, to the deep mucks of the eastern Coastal plain; from the raw exposed subsoils of the Piedmont to the deep arid sands of west Florida; from the massive loessal bluffs along the Mississippi to the coarse talus slopes of western mountains. These situations have few common denominators, if any, except that on all of them some productive forest growth does occur.

	1945	1953	Change
		Million Acres	
All Forest Land	624	648	+ 24
Commercial	461	484.5	+ 23.5
Non-commercial	163	163.5	+ 0.5
Cropland	525	411	−114
Pasture & Range	609	693	+ 84
Other (urban, highways, waste, etc.)	147	152	+ 5
Total	1,905	1,904	− 1

Adjustments in Land Use . . .

Perhaps we would need to be less concerned with improvement of forest sites, if we were assured that an abundance of fertile land would always be available for the production of wood. After all, fertile soil makes many aspects of wood production simpler, easier, and more rewarding. Unfortunately, good soils are not abundant enough now, and they will get scarcer in the future. Adjustments in land use continue to take place, and where they occur, the quality of the soil left for the forester is frequently lower than that of the average of the sites available to him in the past.

The extent of adjustment may be more rapid and significant than is generally supposed. A hint on the rate of change is obtained by comparing land use data from the Reappraisal Report of 1948 and the Timber Resource Review of 1955. In the 8-year period from 1945 to 1953 the area of commercial forest land apparently increased by 23½ million acres as listed above:

Having only these bare figures, we may merely speculate on the nature of the land that was involved in these shifts in use, but some speculation appears permissible. Part of the very large area involved in cropland reduction shifted or was absorbed in pasture development, but we know that pasture acreage has also been augmented by clearing of some choice forest sites, particularly bottomlands.

Part of the 5 million acre increase in "Other" category doubtless represents former commercial forest land that has been irrevocably lost to forestry through extension of highways and encroachment of "suburbia." Although improved accessibility may account for some increase in commercial forest acreage, the bulk of the 23½ million acres that shifted into this category represented former fields and pastures proven unfit or unprofitable to the agronomist and the herdsman. It seems fairly probable that this acreage increase served also to dilute the site quality of our commercial forest land.

Fig. 1—Root System of a Pine.
Pine roots, 6 in. in diameter, breast high, show extensive development of tap and lateral roots in loamy sand soil. The tap root is exposed to a depth of about 36 in. When this root system dies and decays, a significant addition of organic matter will occur in the soil mass which forms the habitat for the roots of trees that follow. In heavier soil, though root development may be more restricted, this form of amelioration is assumed to yield even greater benefits. (Photo by author.)

Natural Soil Improvement . . .

Since forest sites of high native fertility seem restricted and susceptible to further attrition, particularly through clearing for cropland and pasture, it is relevant to examine some of the opportunities and possibilities for improving the productivity of existing sites.

First, let us consider briefly improvement that may occur in forest sites simply from action of vegetation and passage of time. In the genesis of soil, the climate, the organisms (both plant and animal), the relief of the land, the parent material, and time each exert their influence in varying degree to produce soil. Each combination of these genetic factors gives rise to a unique set of characteristics which define a soil type. On only one of these five factors, namely organism (or vegetation), do we ordinarily regard the forester as exercising a reasonably large measure of control.

The forester manipulates stand density by thinnings, improvement cuts, and the like; he alters forest composition by weeding, discing, burning, poisoning, and similar treatments. These operations and treatments modify the forest soil primarily in two ways. First, they may alter the forest floor in amount, in character, or both; and, second, and sometimes even more significantly, they may bring about deeper change through decay of roots and openings of channels in the subsoil (Fig. 1).

Some changes may be largely physical and mechanical, but others are of much more subtle and complex nature, working through faunal and floral populations, through energy relationships, through infiltration and storage of moisture, and through related means. The good silviculturist naturally hopes that these changes will result in the ultimate improvement of site for continuous production of wood, and it seems safe to assume that they do result in such improvement.

However, critical data on changes in site quality through silvicultural manipulations are largely lacking, and frequently it may be supposed that the immediate effects of some treatments, such as discing and furrowing, may look harsh and bad if viewed against a perspective of virgin forest soils, i.e. soils that have never been subjected to cultivation.

Virgin Stands Not at Peak . . .

It would probably be erroneous, however, to make the tacit assumption that soils in the relatively undisturbed forest areas even in their virgin conditions had attained the peak of fertility and productivity possible for any given set of climatic, geologic, and physiographic factors, though superficially this assumption seems tenable enough. Even in the virgin forest trees grew old and died, some falling to pieces *in situ*, others being uprooted. With each up-rooting, a substantial disturbance of soil occurred,

Fig. 2—A Wind-Thrown Tree . . .
This tree was approximately 20 in. in diameter, breast high, in a climax forest of maple-basswood on silt loam soil. The bole, as well as the roots, of the fallen tree will gradually decay, making substantial additions of organic matter to the relatively heavy soil. The disrupted ground surface, initially about 10 ft. in "diameter," is slowly filling with drifting leaves, interspersed by clods that slough down from the up-turned mass. (Photo by author)

a sort of a natural form of cultivation, bringing about a deep mixing of leaf-mold, litter, and sloughed soil from the up-turned mass, or opening up deep channels into the sub-soil after roots have decayed (Fig. 2).

These changes produced better growing conditions for new trees as they replaced the old, or, at least, it is conjectured that they did. If these fortuitous events in unmanaged forests were helpful, consider how much more rapid and extensive may be the improvement in a managed stand where a single thinning may remove from one-third to one-half of the stems. Site improvement of this nature should naturally be greater under species that do not sprout, since their stump may undergo rapid decay. In stands of second-growth southern pines, for example, substantial deterioration may occur already within 2 to 3 years after cutting.

Unfortunately our limited experience does not permit doing more than to speculate about how much site improvement can be expected through these essentially natural methods of amelioration brought about by conventional silviculture. We know that differences of 10 ft. in site index (and with the right species on the right sites) may show differences of 25 to 50% in volume for any given period required to grow trees to a specified condition of maturity. It does not appear over-optimistic to look toward increases of 5 to 10 ft. in site index as a result of gradual soil improvement after one or two rotations of timber on uplands that have undergone impoverishment and deterioration of physical structure and subsequent abandonment from agricultural use.

We may recall that many soils in the humid, forested portions of America were not naturally productive for agricultural crops. Some of the very poorest were relatively stone-free, level, deep soils with clay-pans or hardpans. These soils were made better by additions of lime, fertilizers, and organic matter, not only on the surface, but also into the subsurface through deep tillage. It seems likely that the productivity of natural forest soils for growing wood fiber can also be similarly improved through liming, fertilizing, irrigation, and related means.

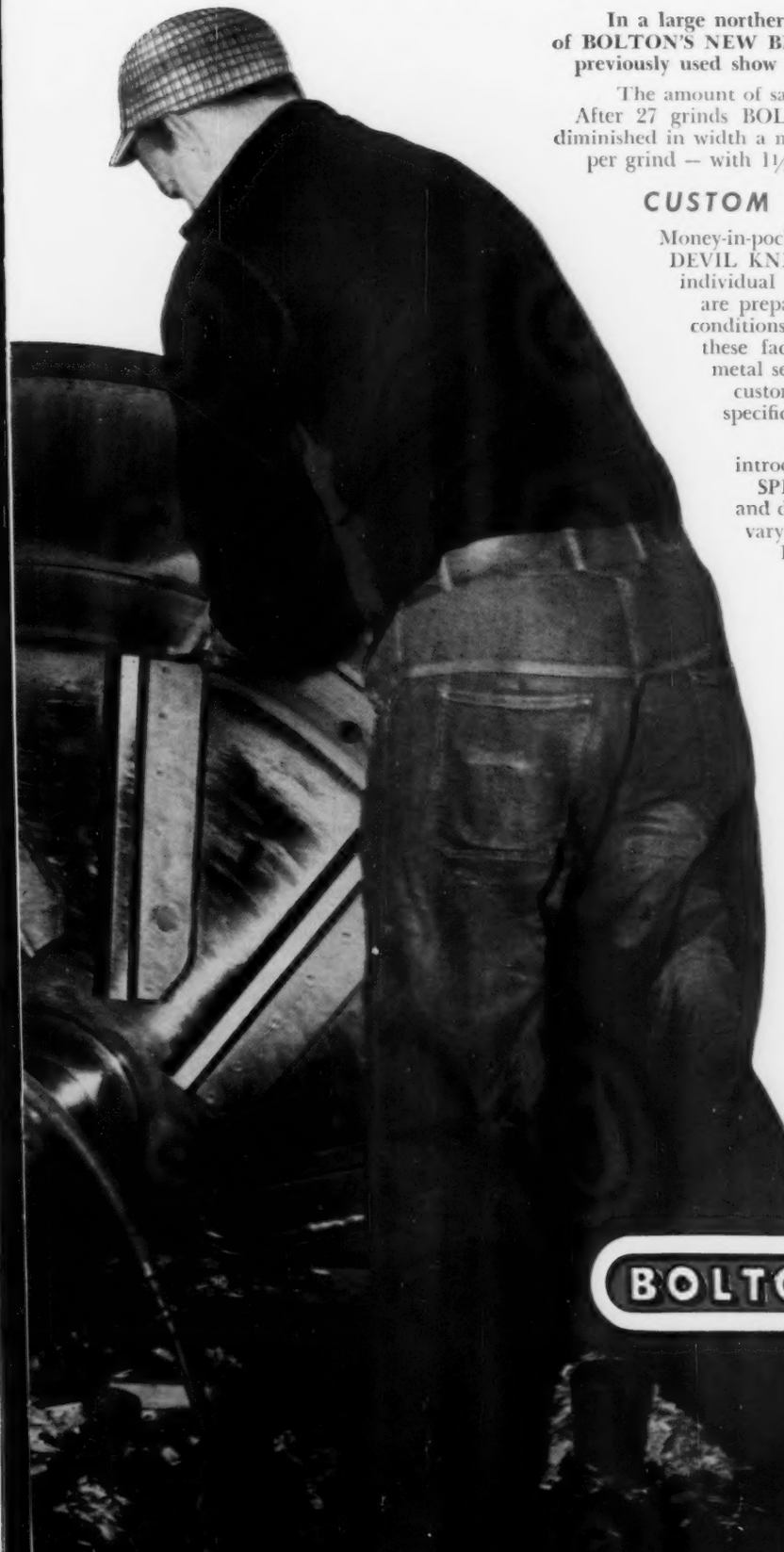
Artificial Soil Improvement . . .

Let us, therefore, examine briefly some of the artificial means by which improvement of site quality might be attained. One of the more promising opportunities for site improvement lies in drainage of wet lands, if the engineering aspects of the problem are sufficiently soluble to enable the removal of excess water.

In North Carolina, alone, we have nearly 2 million acres of forest land on which poor drainage is holding productivity far below the probable potential or capability of the land to grow trees. Preliminary results from drainage of some of these lands is encouraging.

Plantations of loblolly and slash pine, made in 1936 and 1937, on the Hofmann forest in Onslow County,

Bolton's BLUE DEVIL Knives save over $185.00 per day in chip production



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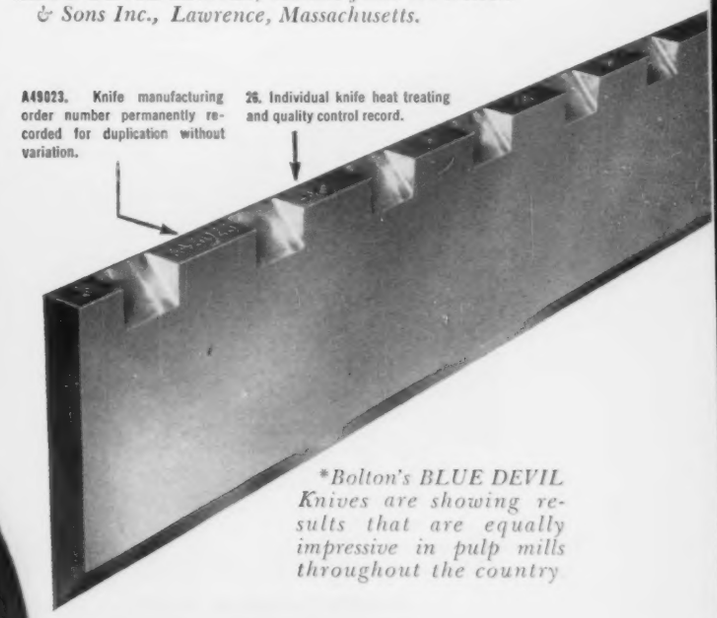
A49023. Knife manufacturing order number permanently recorded for duplication without variation.
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N. C., have averaged a cord of peeled wood per acre per annum on land which at planting time was so wet that planters experienced difficulty in keeping the seedlings from floating out of the ground, using the bar-planting method.

This yield has been achieved mainly within one-eighth mile of the highway drainage canal, but without benefit of lateral ditches, and also in a period of stand development which is still considerably short of the culmination point of mean annual growth.

Within 200 ft. of the canal, loblolly pine at 19 years has averaged about 2 cords of peeled wood per acre per year. A hundred yards from this drained plantation, and on the same soil type, but in an area where railroad and highway embankments have blocked off drainage toward the canal, the yield of planted loblolly has averaged only one-seventh cord (12 cu. ft.) of peeled wood per acre per year.

Not all wet land is drainable. We have found local areas on the Hofmann forest where, due mainly to impermeability of the subsoils, the water table stays within 8 to 10 in. of the surface, even within 60 ft. of the main canal (Fig. 3). Some preliminary indications suggest that good growth of loblolly pine can be achieved if the water table drops to about 18 in. below the ground surface during the growing season.

In general our experience in eastern North Carolina accords with earlier studies in the swamps of the Lake States where some land did not respond at all to drainage, and where ditches lost their effectiveness within a distance of about 300 ft., and also with experience in Finland where less than half of their 29 million acres of swamp appears suitable for commercial forest production, if engineering difficulties can be surmounted.

Nevertheless, in North Carolina in the areas where adequate drainage has been obtained, we have evidence of having raised the site index by as much as 25 ft. over that which the land represented before drainage.

Application of Fertilizers . . .

Aside from site preparation which cannot be cleanly separated from site improvement, another possible avenue to higher site quality lies in the application of fertilizers alone or in combination with cultivation. The idea of fertilizing forests is not new. Some foresters were already investigating its possibilities over 50 years ago and today there is renewed interest in the practice all over the world.[1] There are at least four rather distinct phases of forest production where fertilizers may be used to advantage.

First, let us consider forest nurseries. Contrary to some early misconceptions, stunted and starved seedlings do not make good planting stock. The annual drain on soil nutrients is so heavy that it is easy to let fertility levels fall below what is needed to grow husky but hardy stock. The dry weight of an annual seedling crop of southern pine seedlings may, for example, exceed 6 tons per acre; moreover, practically the entire crop is lifted, leaving essentially no crop residues in the soil.

The annual requirement of elemental nitrogen, alone, may equal 150 to 200 lb. per acre, and, of course, a balanced and uninterrupted supply of phosphorus and potassium is also essential. It appears certain that maintenance of satisfactory fertility in nursery soils will require application of fertilizers at rates considerably higher than are needed for many farm crops, such as cotton and corn.

A second important area where fertilizers can be used to good advantage is in seed production areas and in seed orchards. A serious bottleneck in artificial forestation is developing, or, indeed, already exists in the supply of seed, particularly from so-called superior phenotypes. The shortage of desirable seed will unquestionably get considerably more acute before the supply situation improves.

In future seed production undertakings, fertilizers are sure to play a role of prominence commensurate with their importance in fruit orchards today. Enough is known already about stimulating seed production by fertilizer application to proceed in some situations with a reasonable degree of confidence, but many aspects of the problem in relation to local soil conditions, climate, species, phenology, etc., need to be intensively studied before any generalized framework of prescriptions can be drawn.

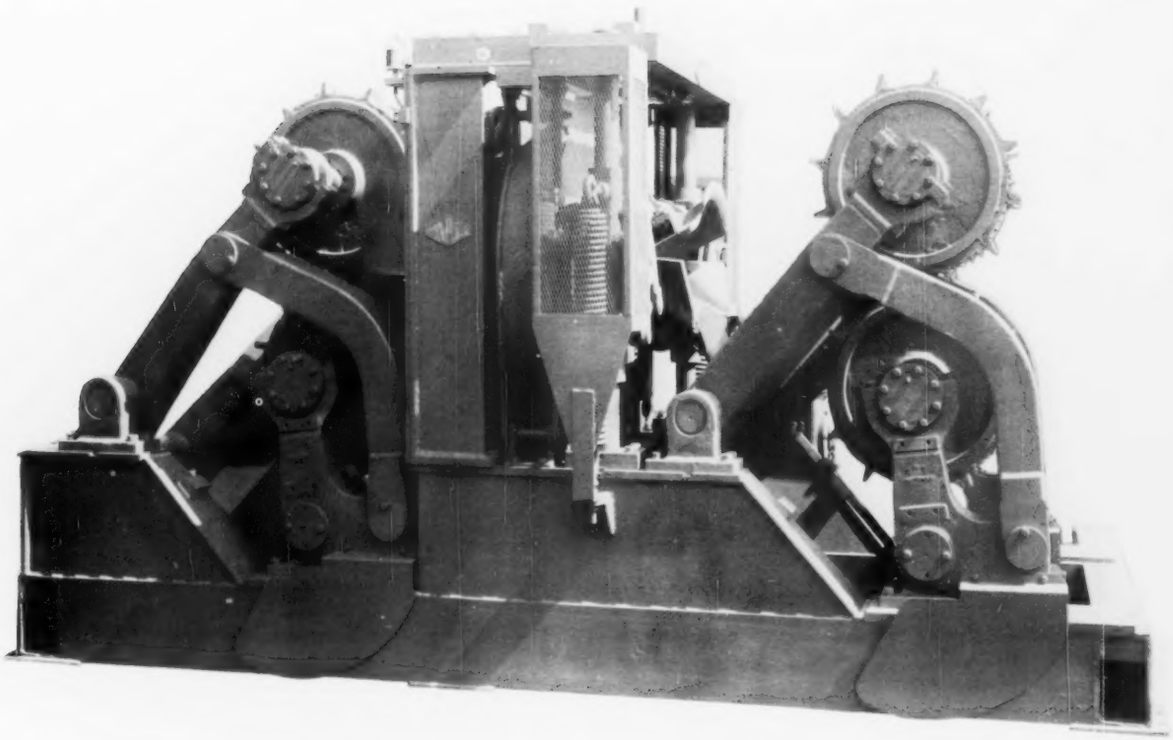
Fig. 3—A poorly-drained section . . .
This area is along the Roper Road canal on the Hofmann forest, Onslow County, N.C. Note tight-appearing mineral soil which is a fine sandy clay loam under about 1 ft. of muck. The mineral soil is devoid of root channels, and free water seldom falls below 8 in. of the muck surface, even during the growing season, despite the evapo-transpiration losses. Although some trees on this area have attained respectable size in the past, their growth has been extremely slow. (The line of posts marks a series of wells on which observations of water table fluctuations are periodically recorded.—Photo by author.)

Fertilizers in Plantations . . .

A third area where fertilizers may eventually find wider use is in the establishment of plantations. Much of the work to date in this area has not been too encouraging, and some of the experiments, particularly with softwood species, have ended in failure.

Applications made at planting time have stimulated weed and grass growth so much that the tree seedlings have suffered or succumbed from the excessive competition. In other instances indiscriminate dosages of mineral salts have caused outright burning of the seedlings. Some minor exploratory work using mild dosages of salts in puddled clay or other carriers and applied directly to root systems suggests possibilities for obtaining "starter" effects on seedlings with-

[1]A recent translation of a German summary on various aspects of forest fertilization has been made available to American foresters through the offices of Nitrogen Division of Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.



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out stimulating the growth of grass and weeds. However, applications of this sort may be too tricky to be practical.

Hardwoods, by and large, are much less susceptible to salt injury, and some, for example black locust, respond phenomenally to fertilizers at planting time. With most species, including softwoods, application of superphosphate at planting time is safe, and subsequent application of nitrogen, potassium, or other elements can be made as needed, if weed and grass growth can be held in check, or if the seedlings have attained a size where the competition of lesser vegetation is unimportant.

Since many sites are already being prepared for planting on almost as intensive a basis as is employed in agriculture, the question has been raised whether subsequent cultivation is worthwhile or safe. There has scarcely been enough experience of the right kind to answer this question fully.

In India a long-established practice of "taungya" culture has involved growth of various crops, such as corn, between rows of trees until the trees grow large enough to interfere and suppress the intervening row crops. Apparently, this type of cultivation has proved safe for tree growth.

In our own shelter-belts in the prairie states, the most successful belts were the ones subjected to intensive cultivation for the first several years. Although softwoods were perhaps in the minority in many of the belts, I have found no references to any deleterious effects of cultivation of either softwoods or hardwoods.

It may further be worth recalling that Pessin practiced a type of cultivating of longleaf seedlings in his demonstration of the need for reducing grass competition to secure height growth at Bogalusa, La., and that Schreiner found it necessary to cultivate in order to establish successful plantings of hybrid poplars. Other experiences could also be cited as confirming the practice, unless some shallow-rooted species like spruce, on heavy soil, is not involved.

For the present, we may extrapolate that on *well-drained* soils where many species, including the southern pines, form adequately deep root systems, cultivation appears safe, and may be practiced when it is shown that benefits exceed costs. In this connection it might be mentioned that the practice of sowing soybeans with cottonwood as has been tried in the Mississippi delta seems to have merit, as does also the oak watermelon-pine sequence in the sandhills region.

Fertilizers in Established Stands . . .

A fourth area where fertilizers may be used to advantage in the future is in the actual stimulation of growth of established forest stands, whether of planted or natural origin. In instances where soils are impoverished, the aim of fertilizing might mainly be to ameliorate the site by stimulating the growth of any vegetation, including brush and weeds, as well as any tree growth that has managed to survive.

In instances where ample moisture is available throughout the growing season, the main objective of fertilizing might be to stimulate new surges of shoot growth in multinodal species like slash pine and loblolly pine which usually make their main surge of height growth in the early spring. In these situations time of application could prove very important.

Studies to date have generally demonstrated that even in stands of marketable size, trees will respond favorably to fertilizing, but in many instances the dosages used have appeared larger than seems economically justified. MacGregor, for example, applied nitrogen at the rate of 500 lbs. per acre, along with varying amounts of phosphate and potash, in four consecutive years to slash pine near Lake City, Fla. He reported an increase of 36% in cu. ft. volume growth when compared with the growth of the preceding 4-year period.

Our own experiments at the Hill Demonstration Forest in Durham County, N. C., in cooperation with the Nitrogen Division, Allied Chemical & Dye Corp., have shown interesting preliminary trends at the end of 5 years following the first of 3 annual applications of nitrogen, phosphates and potash in various combinations.

The raw averages of periodic (5 yr.) diameter growth in relation to levels of ammonium nitrate application are tabulated below:

Age of plantation of loblolly pine when first application was made	No N added	NH_4NO_3 at rate of 80 lb./A of N	NH_4NO_3 at rate of 160 lb./A of N
Years	Inches	Inches	Inches
6	1.49	1.66	1.73
9	1.10	1.28	1.48
12	0.98	1.38	1.55
16	1.26	1.59	1.62
Mean of all ages	1.21	1.47	1.60

Judging Benefits . . .

The 80 lb. annual dosage has increased diameter growth of these loblolly pine plantings about ¼-in. in 5 years, while doubling the dosage has added about 0.15 in. more in the same period. If the growth differential were to terminate at this point, superficially it would appear that the benefits are insufficient to defray the costs. However, it is not known whether further differentiation will occur, or taper off rapidly and stop.

Some European experience suggests that beneficial effects from fertilizing may last up to two decades or longer. Moreover, there is a possibility that the growth characteristics have been altered so that a greater volume of summerwood is being laid on. If this actually happens, the benefits of fertilizing cannot be judged solely on volume production.

Average growth in height of fertilized trees has exceeded the growth of unfertilized trees by 1 to 2 ft. during the 5-year period. If this growth differential were sustained for a decade or more, an increase of 5 ft. in site index would appear attainable. Such improvement in site quality should be worthwhile. However, there still remains the job of determining under what circumstances and with how large an expenditure of materials and manpower it is possible to achieve this improvement under varying conditions of soil, climate, and species.

In conclusion, I should mention that several other aspects of site improvement might also be discussed, including the impact of forest genetics on site and the possibilities of some of the "wonder drugs," like the gibberellins, for improving the performance of trees on poor sites. The many facets to site improvement suggest that we are not likely to reach a ceiling in this area very soon. The main precaution that seems necessary now is to guard against that practice of regarding the accepted as the ultimate.

Increasing Utilization of Woods and Mill Leftovers

SPEAKERS AND CHAIRMAN AT FOURTH SESSION: Left to right are LELAND W. HOOKER, Michigan College of Mining & Technology; THOMAS BAKER, St. Regis Paper Co.; and C. M. MATHEWSON, St. Marys Kraft Corp. and D. E. HESS, Glatfelter pulp Wood Co.

What Does Sawmill Chipping Cost?

How barking and chipping by these mills can be profitable and also help solve wood procurement problems in South

By G. W. BRUMLEY and C. M. MATHEWSON
St. Mary's Kraft Corp.

● Currently our mill is receiving chips from five sawmills and we have definite plans for receiving chips from six more. It is estimated that these mills will supply us with about 1,200 to 1,300 cord equivalents per week, or roughly 15% of our consumption. (The cord equivalent referred to is 5,000 lbs. of chips.) Our future plans call for an eventual 20 to 24% of our consumption from sawmill waste.

A very scholarly paper giving some very good cost figures has been prepared by our forest engineer, Jim Holekamp, entitled "Late News on Debarkers." Among other useful information, he has a chart showing the complete cost of producing chips from sawmills of various annual capacities, including depreciation costs on equipment. I find his figures to be on the conservative side. (This report was published in the 1956 PULPWOOD ANNUAL, commencing on page 90.)

Before discussing the benefits to be derived from chip installations, I think it desirable to clarify the different types of chip installations with their relative costs:

(1) Sawmills with round log debarkers and chippers that will handle capacities in excess of 20,000 bd. ft. daily.

(2) Sawmills with round log debarkers and chippers that will handle capacities under 20,000 bd. ft. daily.

(3) Sawmills with round log debarkers only and one centralized chipper.

(4) Slab concentration yards for sawmills having no debarkers or chippers. Slabs from these sawmills would be hauled to a centralized yard where slab debarkers and a chipper convert the slabs into chips.

In the first category, an installation will consist of a round log debarker such as the Nicholson Roto-Barker, the Cambio debarker, the Hurricane debarker, or other debarker handling equivalent volumes of round wood. In addition to the debarker, the sawmill will need a wastewood chipper and screens if required by the chip purchaser.

Cost of Chip Equipment . . .

The cost of chip equipment such as this, together with drives, infeed, outfeeds, and motors, will run between $40,000 and $50,000. When the cost of installation is added together with necessary log decks, bark, slab, and chip conveyors, the total investment will run between $65,000 and $100,000, depending on the following: (1) The amount of change-over necessary in the sawmill. (2) The type of conveyors built—home-made wooden troughs or prefabricated metal troughs. (3) The extent of mechanization of the mill, such as the inclusion of live log decks, automatic stop and loaders, etc.

The profit from this type of installation is good and proved. The amount of profit per cord equivalent depends on the amortization rate of the equipment. If all the returns from the chips were applied to paying off the cost of chip installation, it is possible to repay it in one year on an operation cutting 30 mbm daily.

Repaid in One Year . . .

Figure it for yourself. The sawmill waste will produce from ½ to 1 cord equivalent per thousand feet of lumber sawed. Band mills and sash gangs will produce less generally than circular mills. Mills cutting nothing but cross-arms will produce the most. Some sawmills run unmerchantable tops through the chipper along with the slabs and edgings. Big logs will produce less waste than small logs.

If we assume that chips have the same value as round pulpwood, then

they would be worth $15.25 per cord equivalent of 5,000 lbs. for chips f.o.b. sawmill in the South Georgia and North Florida territory.

A sawmill cutting 30 mbm daily with an average of 7/10 of a cord equivalent per thousand feet sawed will produce about 5,250 cord equivalents per year of 250 working days. 5,250 times $15.25 equals approximately $80,000 gross income per year. If the cost of his installation were $80,000, and the operator should be able to have a good installation for this amount, it could be paid off in one year by applying all the proceeds from the chips.

However, if the operator wanted to amortize his investment over a three-year period, he would have an annual profit of $36,500, which would amount to about $7.00 per cord equivalent or about $4.90 for every thousand board feet sawed. With current market conditions on Southern pine timber, there are a lot of mills in the South that would be happy to be realizing $5.00 per thousand board feet profit for the lumber they are sawing, to say nothing of realizing this much profit from their waste.

Basis of Figures . . .

These figures are based on three extra men being required for the chipping operation at $8.00 per man per day, $1.00 per cord for electricity, and $1.00 per cord for maintenance. I wouldn't argue with you if you said that my labor cost was a little low, but if it is, I think possibly my maintenance cost is a little high.

If the cost of this installation of $80,000 were amortized over a five-year period, it should yield a yearly profit of $47,500, which amounts to about $9.00 per cord or about $6.30 per thousand board feet sawed.

This potential profit will be higher if the daily cut exceeds 30 mbm, as the investment will be the same and the labor about the same. By the same token, this profit will be reduced if the daily cut falls below 30 mbm. With a price of $15.25 per cord equivalent for chips, the breakeven point is about 17 mbm daily cut, and this type of investment is not recommended for mills cutting less than 20 mbm. Mills cutting less than 20 mbm daily should seriously consider one of the other three types of installations.

With Different Debarker . . .

The second type of installation consists of a cheaper type of round log debarker such as the Jackson "Little Beaver" or the Fulghum debarker as manufactured and sold by Wilco Machine Works, plus a chipper, and screens where required.

The difference in this type of equipment is largely in the debarker. The debarkers are simpler in debarking principle and simpler in design and construction. They seem to do a satisfactory job, but it is slower. For mills cutting less than 20 mbm daily, I think that this type of equipment should be investigated.

The total cost of chip equipment for this type of installation will run from $20,000 to $25,000, and total installation cost including equipment would run from $30,000 to $40,000, depending on amount of mill changeover and degree of mechanization.

The amount of labor required for this type of debarking and chipping operation is about the same as for the installations handling larger volumes. One man is required to operate the debarker and one man to tail the operation.

Whether or not a third man should be charged to this operation or to the regular mill operation is debatable. The full time of the third man is not required but rather part of the time of the supervisor, millwright, saw filer, etc. Actually it is necessary to hire only two additional men.

Cost of Chips Greater . . .

In this setup, the labor cost per cord of chips is greater but the equipment depreciation is less. A sawmill cutting 15 mbm daily with an average yield of 7/10 cord equivalent per mbm sawed would yield approximately 2,625 cord equivalents per year of 250 working days. At $15.25 this would amount to approximately $40,000 annually.

If we depreciated a $40,000 investment over three years, and charged three men to the operation at $1.00 per hour and used the same figures of $1.00 per cord for electricity and $1.00 per cord for maintenance, we would find a net profit of $15,446.

This would amount to about $5.88 per cord equivalent of chips produced or about $4.12 per thousand board feet of lumber sawed if we continue to assume that there will be 7/10 of a cord equivalent of chips produced from the waste of every thousand board feet of lumber sawed.

While these debarkers have been adequately field tested, and many complete chipping operations are being installed, none have been operating long enough to determine exact cost figures. I would consider the break-even point to come with mills producing 6 mbm daily. However, a mill cutting 8 mbm daily, employing two extra men and a total of $30,000 for equipment installed would show a profit of about $9,200 per year. This would amount to approximately $5.25 per cord equivalent of chips, or $3.70 per thousand board feet sawed.

Less Equipment Cost . . .

The third type of installation envisions two or more small sawmills installing the cheaper type of round log debarkers, as just mentioned, with one centralized chipper. This would result in less equipment cost by not installing a chipper at each mill, but there would be an increased cost of handling slabs.

The peeled slabs from each mill would have to be transported to the centrally located chipper, which should be located on a rail siding so the chips could be loaded directly in

One Way is Round Log Debarking, Chipping at Sawmill . . .

This Nicholson mechanical debarker at sawmill on the West Coast barks all incoming logs. Residue wood can be converted to chips at sawmill in this operation.

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a freight car. This would not be necessary if the chips were to be trucked to the mill. Where possible the chipper should be located at one of the sawmills so that the slabs from that mill would not have to be transported. I know of no such operation as this in existence at this time, but several are contemplated.

To arrive at some figures, we will say that three mills, each with a daily output of 15 mbm, will chip their slabs and edgings through one chipper which is installed at one of the three mills. The total cost of chipping and debarking equipment for the three mills, including a fork lift for handling the slabs at the mill doing the chipping, will run about $54,000. With conveyors and installation, it will probably come to $60,000.

The labor requirements will consist of one man to operate the debarker at each sawmill and one man to tail the operation at the mill where the chipper is located. There will be a very real cost resulting from transporting the peeled slabs from two mills to the chipper at the third. This cost will vary with distance hauled. For lack of any real figures, I am using a cost of $4.00 per cord for this peeled slab transportation.

Assuming that 5,250 cord equivalents of chips will be produced annually, there will be a gross income of approximately $120,000, with total costs amounting to about $73,050. This will figure out to about $5.96 per cord equivalent or about $4.17 for each thousand board feet sawed by the mills. What is gained by having smaller investment depreciation is lost in cost of transporting slabs.

Slab Concentration Yard . . .

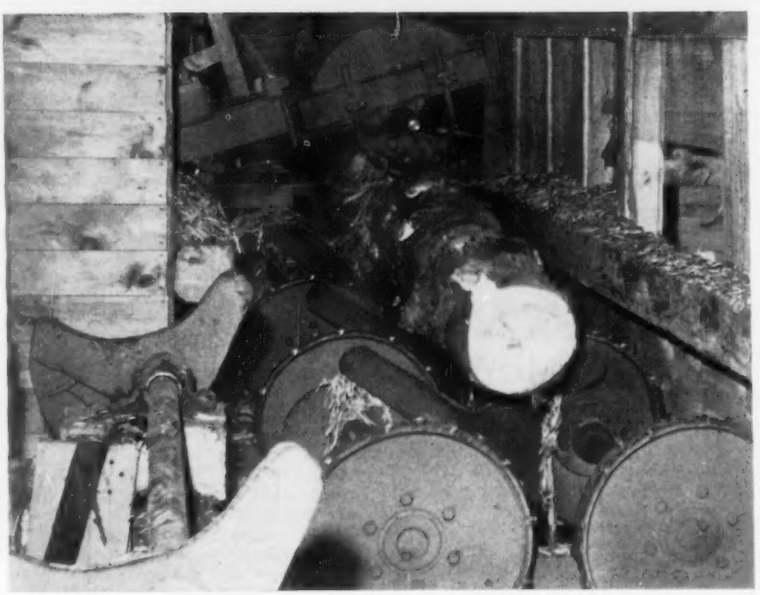
The fourth method is referred to as a slab concentration yard. In this system, the slabs are brought to a concentration point from several mills. I would say that the slabs from mills cutting at least as much as 150 mbm weekly should be available. It has been found best to buy only slabs at the concentration point and to let the small mills continue to dispose of their edgings.

It is estimated that 7,500 lbs. of slabs will produce a cord equivalent of chips. It is customary to mount a scale on the fork lift that unloads the slabs, thereby weighing them at the same time they are unloaded. Equipment for this type of operation consists of a chain or hammer flail type of debarker or the more recent chain-rossing type of slab debarker. In addition to the slab debarkers, a chipper is required, and some mills require the chips to be screened.

While the manufacturer of one of the slab debarkers has operated a slab concentration yard for a number of years, others have been slow to follow. With the price of chips under $12.00 per cord equivalent it was at best a marginal operation. With the advance of chips to $15.25, the venture is again being tried by a few.

I believe a slab concentration yard can be operated profitably provided two factors are considered. First, the delivered price of unbarked slabs should not exceed $6.00 per 7,500 lbs., and second, a large volume must be maintained. One debarker should be run at least two shifts or, if the yard is to be operated for one shift only, then at least two debarkers must be operated.

Present experience with which I am familiar shows that 1 to 1½ cords per hour is all that can be peeled satisfactorily. It is possible to peel as high as four cords per hour through one of these machines, but the resulting bark content is too high. Experiments are currently being made with a machine that has two debarking heads instead of one. While it is too soon to get the answer, it is hoped



This System Goes a Step Further . . .

In recently developed system operating in Northeast, Eaton hydraulic chain-flail round log debarker is positioned at small sawmills ringing central slab-to-chip concentration yard, where slabs from sawmill operations are chipped, hauled to pulp mill. At top, close-up of log debarker head; bottom, debarking winter wood at Vermont sawmill. Pics by P&P.

that it will be possible to feed slabs through it at a faster feed rate and still get a satisfactory peeling job performed. Since labor is by far the highest cost in this operation, it is possible that the perfection of this machine may result in much more profitable operation.

Cost Figures . . .

To arrive at some costs, let's assume that one debarker will be run three shifts, with a debarking ability of 1¼ cords per hour. These debarkers range in price from $4,500 to $10,000, but for cost purposes we will use the $10,000 figure.

One man will feed the slabs to the debarker, one man will tail the whole operation, throwing out slabs improperly debarked, and one man will operate the fork lift. If two or three machines are operated, only one man is required to tail the entire operation. The lift operator is paid $1.25 per hour, and the other two men are paid $1.00 per hour.

The cost of equipment for this type of operation will run about $35,000 including a fork lift, and with installation costs and conveyors should not exceed $40,000.

With delivered cost of slabs at $6.00, labor costs of peeling 1¼ cords of slabs will be $2.60 per cord, and with electricity and maintenance costs each set at $1.00 per cord, and depreciation on a three-year basis amounting to $1.78 per cord, we have a total cost of $12.38 per cord for costs. With chips bringing $15.25, that leaves about $2.87 per cord profit. If 7,500 cords are produced annually, a net profit of $21,525 is realized. This would amount to approximately $1.87/thousand board feet of lumber sawed.

These are shown in tabular form in accompanying table.

Fallacies Considered . . .

Let me be the first to say that there are many fallacies in my figures. Some cost items were not included, and some included were too high. However, the greatest fallacy is in assuming that the sawmills are going to operate 250 days out of the year without shutdown. All sawmills will have a certain amount of downtime caused by mechanical failures and inability to log the mill. As a result, all these figures should be revised downward according to estimated percent of downtime anticipated.

The purpose in presenting these figures was not to give precise dependable figures, but rather to give an indication that recovering chips from sawmill waste could be a profitable enterprise.

Debarking at Sawmill Integrated with Pulp-paper Mill . . .
Here Soderhamn hydraulic chain-flail barker processes logs entering sawmill which is integrated with large Northeastern pulp-paper mill. Slabs from sawmill are chipped, loaded on box cars and shunted to adjacent pulp mill.

Advantages Listed . . .

It is a profitable enterprise in dollars and cents to the sawmills and advantageous to the pulp mills in a different way. The advantage to the pulp mills lies in making available a large additional source of wood fiber. To those of us in the South who are concerned with logging our pulp mills, this is of prime importance.

About a year ago, practically every pulp mill in the South was "sweating it out" trying to keep enough wood at the mill to keep it from shutting down. Inventories were going down at an alarming rate, and there didn't seem to be any way to reverse the trend. Bad logging weather? No. Actually, we were going through a drought that left most of the swamps dry enough to log without skidding. The trouble stemmed from the fact that the wood dealers had run out of private stumpage and couldn't buy enough to keep up their production.

It was at this same time that many companies were announcing large expansion programs and informing the world that there were ample timber reserves to adequately log these expansions. However, the man faced with having to buy the timber never could quite find out where all this available timber was located. Statistics can often be misleading. I am not in a position to argue with the folks that turn out the reassuring figures showing the large volumes of standing timber present in the South. However, it should be remembered that if the owner will not sell timber or if it is not accessible to railroads with reasonable freight rates, then it is not available. Timber that is not available might just as well not be there as far as logging a mill is concerned.

Need for Sawmill Waste . . .

The point I am trying to make is that, with no further mill expansion in the South, we are going to have a difficult time logging our mills for the next five to ten years. After that period, we hope our company lands and the lands of private individuals will be more productive due to fire protection, planting, and land preparation. During this period, the use of sawmill waste to produce part of the necessary raw material will be a godsend.

By logging our mill one day a week from sawmill waste, we will cut approximately 10,000 less trees per week or about 500,000 less trees per year. This will conserve the timber on about 20,000 acres per year for other uses or for future pulpwood needs.

At the present time, there are nine other competitive pulp and paper mills in our wood procurement area that are either in or going in the sawmill wastewood chip program. This could reduce the demand for round pulpwood by 10 to 15% in our wood procurement area. This could be the deciding factor in keeping all the pulp mills logged to full capacity.

Operation	Total Investment	Net annual Profit	Profit per MBM Sawed	Profit Per Cord Equivalent
I A (3 years)	$80,000	$36,500	$4.90	$7.00
B (5 years)	80,000	47,250	6.30	9.00
II	40,000	15,446	4.12	5.88
III	60,000	46,950	4.17	5.96
IV	40,000	21,525	1.87	2.87

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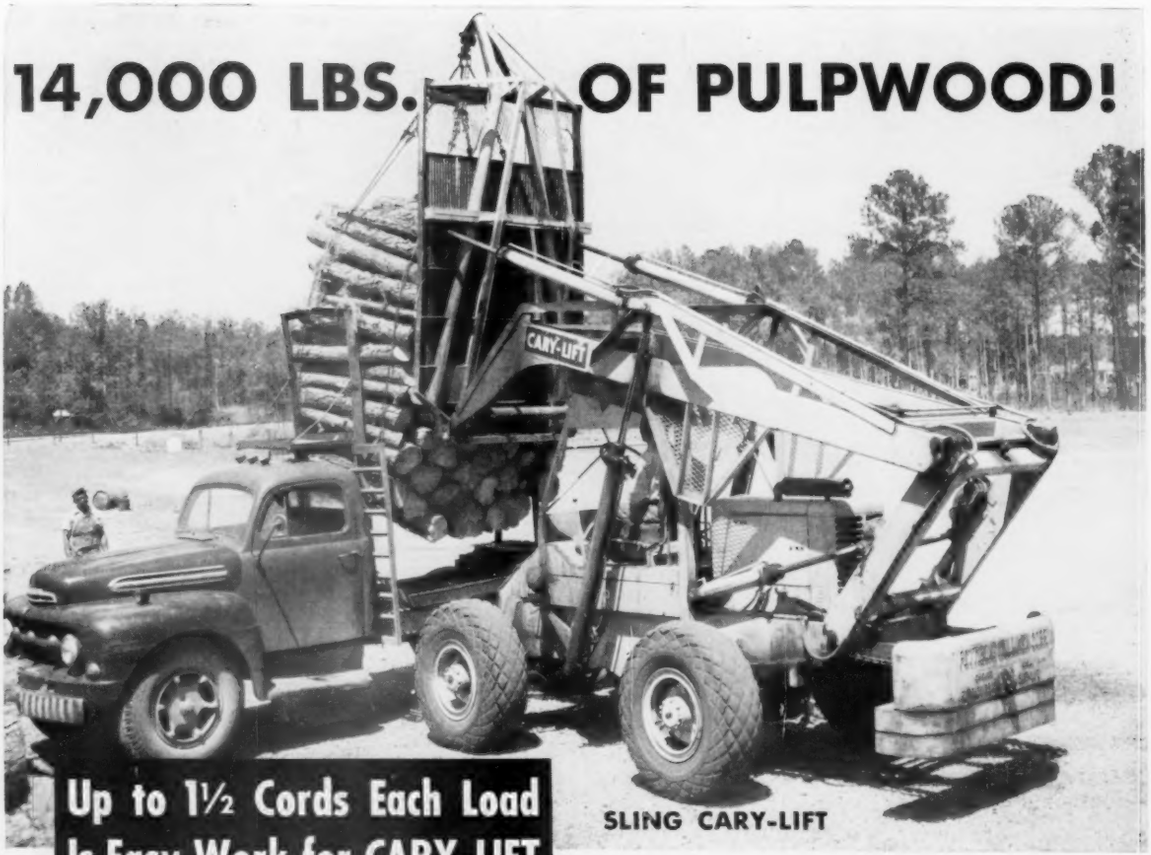

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Standardizing Railroad Car for Chips

How box cars and hopper-bottom cars are being used; their advantages and disadvantages in transporting chips

By THOMAS BAKER
St. Regis Paper Co.

● Rail transportation of pulpwood chips is our most important means of delivery in the South, for the large majority of chips purchased are delivered by this method. The popularity which the railroads have is in part due to the desirable freight rates and in part to the general practice of locating sawmills and paper mills on adequate rail systems.

Car-Building Program . . .

Since Jan. 1953, the time of the first chip delivery in the Southeast, individual companies have attempted to improve the handling of chips in railroad cars. Several types of standard railroad cars have been used, along with several types of cars especially built or modified to carry chips. And each has performed the job with varying degrees of success.

The fall meeting of the Southwestern Technical Committee of American Pulpwood Assn. devoted most of its time to the subject of chip cars, with the purpose of moving the association members to the selection of one car design which will serve the needs of industry in the South. Such a selection will guide the railroads and allow them confidence enough to carry out a car-building program proportionate to the chips handled.

Box Cars . . .

The box car has transported more chips to date than any other type and is still preferred by some as the best chip car. The advocates of the box car have some specifications regarding the use of the car, the construction of the car, and the capacity of the car which are intended to improve its usefulness. These box cars are to be limited to chip service only, thereby reducing the need for clean-up prior to loading and reducing the chance of polluting the chips with material left in the car.

The box car should be made entirely of steel. This will eliminate the use of cars with patched floors and walls which have often been assigned to chip service in the past. These patches are sometimes picked up by the unloading scoop and result in pulp mill downtime and damage to equipment.

Cars with the larger doors, such as automobile cars, are preferred. This allows the unloading scoop more room to maneuver. The last request is that the cars have a weight carrying capacity of 100,000 lbs. or more and a volumetric capacity of 4,900 cu. ft. A box car of this size will carry 20 cord equivalent units of chips, when filled to 85% of its capacity at origin. Eighty-five percent is good loading for a box car and is difficult to maintain.

Advantages and Disadvantages . . .

There are several advantages of box cars over other cars considered. The

Unloading Box Car of Wood Chips . . .
At top, scoop truck begins the unloading process at the paper mill. Bottom, the scoop filled, truck makes first trip to empty chips in the hopper. Many trips and 2 hr. 35 min. later the box car will be empty.

advantage to which most importance is attached is the availability due to its universal use. However, in an overall shortage, cars might be reassigned to other service. Second, box cars are generally allowed to move freely off the rail of the owning line for loading and unloading. The closed box car provides protection against contamination of chips in transit. And last, the loading and unloading equipment usually represents a lower initial investment than that required for other type cars.

The box car also has its disadvantages. The slow rate of unloading is probably the most objectionable of these. The rate of unloading with a scoop truck is about 35¼ cords per 8-hr. man-day and with suction equipment it is about 16 cords per 8-hr. man-day. The cost of cleaning each car and installing grain doors in preparation for loading, about $5 per car, is also objectionable. The loading equipment for box cars requires more supervision and generally more horsepower than for open top cars. Scaling the volume of chips in a box car is difficult.

Hopper-Bottom Cars . . .

Modified hopper-bottom cars account for the transportation of most of the chips not carried in box cars. And there are clear indications that this car is preferred over the box car by most of the companies who purchase outside chips. Like the box car, there are certain specifications which are important to the serviceability of the hopper-bottom car.

The hopper car should be capable of delivering 20 cord equivalent units of chips, that is, a capacity of 100,000 lbs. and 4,200 cu. ft. This open top car can be loaded to its full volume at origin with comparative ease.

Cars with large capacity are desirable, in whatever design is selected, as the increased volume reduces the unit cost of loading, switching, hauling, scaling and unloading as well as to reduce the number of cars required to move the freight. Some railroads are even considering hopper-bottom cars of 35 cords capacity. Such a hopper-bottom car would need to be partitioned into two compartments to facilitate unloading.

The hopper cars should be of all-steel construction to allow the use of the top-car shaker and to keep the car in service, not in the shop. Any pockets which might gather dirt or gravel in transit should be eliminated, for such dirt can fall into the pit with the chips during unloading.

The top should be open to provide ease of loading and there should be multiple hoppers in the bottom to speed the unloading. No loss of chips, contamination of chips, or other difficulty which could be related to the open top has been noted in a year's experience. The slope sheets should be 35° from the horizontal rather than the 30° common to coal cars. This additional 5° cuts the shaker operation time in half and can be accomplished by a false bottom in the standard coal hopper.

Rust and scale should be thoroughly removed from cars converted for chip service and then the car should be coated with a durable corrosion-resistant material to avoid rust contamination of chips. Mounting brackets should be provided for the use of side car shakers. Another bracket should be provided for attaching the spotter cable and this needs to be strong enough to allow several loaded cars to be moved at a time. Internal as well as external ladders are needed and there also should be a device for holding the hopper door open as chips discharge.

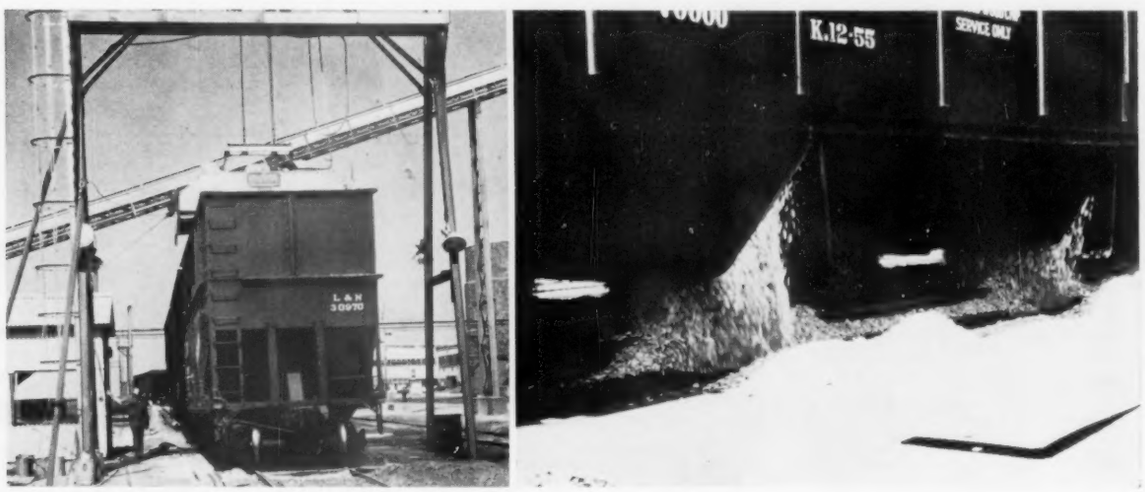
Several railroads are already providing hopper bottom chip cars that meet all of the above specifications.

Advantages and Disadvantages . . .

There are several advantages offered by the use of the hopper car. First, the ability to unload at a rate of 400 cords per 8-hr. man-day. Second, most of the southern railroads have a large number of hopper-bottom cars, not in full use, that can be converted at low cost. These cars are limited to chip service only, thereby reducing the danger of chip contamination and avoiding the loss of transportation in a seasonal shortage of other type cars. Unloading equipment can be arranged to handle the dumping of truck trailers at little added expense.

The hopper-bottom cars also have their disadvantages. The unloading system required is comparatively expensive. The problem experienced in the earlier days of the pulpwood rack car might be repeated where the owning line will not allow its cars to leave its rails for loading or unloading. However, there are cases now where hopper cars leave the owning line for loading and for unloading without difficulty, but there are also cases where the owning line does not allow this interchange.

There is a question about the effect of rain on the open car where the



Unloading Hopper-Bottom Car . . .
At left, hopper car is positioned over the pit, the shaker lowered onto the car; operator is about to throw the shaker switch that will begin unloading process. At right, shaker now in operation, streams of chips flow from car to pit below—and 6 min. 30 sec. later, car will be empty.

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chips are purchased by weight. This may or may not offer a problem, but a very good way to avoid it and a few other problems is to purchase entirely by volume.

Other types of chip cars such as the bottom dump gondola, the cars with the built-in angle iron plow and the side dumping box cars will not be reviewed due to the lack of experience with them, but I believe that these cars can be classed as experimental for the time being.

This review should leave you with several questions. First, are purchased chips being received at your mill in an efficient system? Second, which type of car should the industry adopt as standard? Third, what is more important to your purchased chip program than the adoption of this standard car and the encouragement that it will give the railroads to meet this growing need?

Using Hardwood Logging Residue

Survey shows much hardwood residue available, experiments underway to get it out of woods and debarked

By LELAND W. HOOKER
Michigan College of Mining & Technology

● Seldom does a technological advance take place in one segment of an industry without its influence being felt to some degree in other segments of that same industry. The truth of this statement is demonstrated in the case of the recent development of processes for pulping dense hardwoods. The ability to make acceptable papers from hardwood fibers created, almost overnight, a vast new source of raw material. This, alone, is of immense significance in view of the increasing demand for pulp and paper products and the dwindling supplies of softwood pulpwood in many areas.

Silvicultural Aspects . . .

The converse of new raw material sources, of course, is new markets, and it is from this standpoint that the forester or silviculturist views the hardwood pulping picture. It is known that young hardwood trees respond to early release from competition just as do the softwoods. The chief deterrent, however, to widespread early thinnings in hardwood stands has been the lack of suitable markets for the products of such operations.

The forester, in many cases, can show that the cost of early cultural operations can be recovered ultimately in the increased value of the trees released, and the shortened period of growth to sawlog size. To any but governments, large corporations, and those who are holding timberlands in trust for their children, however, this argument is similar to the one that it is more economical to own a Cadillac because the turn-in value is high and the operating costs are low. Both arguments are sound, but most of us simply cannot afford the initial investment. The emergence of a large, stable market for small-sized hardwood trees holds the promise of widespread early thinnings which can only result in faster growth and better quality trees.

Some Problems to be Solved . . .

You will note that I qualified my last statement by saying that the development of markets "holds the promise" of widespread thinnings. This qualification was necessary because there are still some problems to be solved in getting small hardwood trees out of the forest and into the pulp mills. I will list some of them:

1. During most of the year, young hardwoods are very susceptible to damage, and scarring the trunk or breaking limbs invites rot which will degrade the final product.

2. The density of young, even-aged hardwood stands often makes it very difficult to maneuver logging equipment without excessive damage to the residual stand.

3. The bark of some hardwood species is more difficult to remove than is that of most softwoods.

4. In young stands, the spreading crowns make it difficult, if not impossible, to fell trees in the desired direction. This complicates the skidding operation.

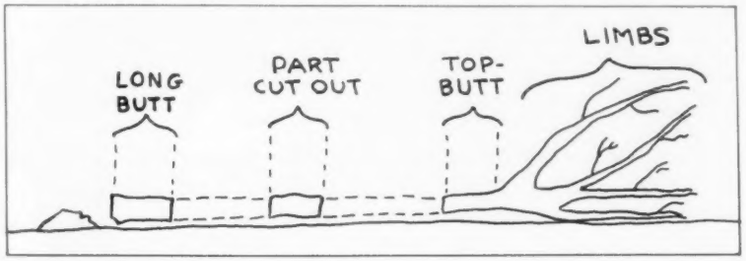
5. Many young hardwood trees are crooked, which makes them more difficult to handle or process with mechanical equipment.

We will leave the subject of utilization of the products of silvicultural operations with the statement that the problems are recognized, and research is in progress which, it is hoped, will provide the solutions to those problems.

Forest Utilization Aspects . . .

The creation of markets for hardwood fiber has its impact on forest utilization no less than it does on silviculture. Most of us, I am sure, were shocked by the situation which existed a few decades ago when hemlock trees by the hundreds of thousands were cut down just so the bark could be utilized for its tannin content, and the logs were left in the woods to decay. Is our utilization of hardwoods any less shocking today, when we cut down trees just so we can make boards, and leave fiber in the woods to rot?

It has been estimated that approximately one-third of the tree is left in the woods as logging residue, and that another third ends up as residue or waste product in the milling processes. I would like to discuss with you some



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work that is being done by the Forest Products Research Division of the Michigan College of Mining and Technology on the utilization of hardwood logging residue.

Resources Survey—Local . . .

It was recognized that before any recommendations as to the utilization of logging residue could be made, or even before any plans for experiments in the harvesting of this material could be formulated, it would be necessary to get more detailed information on the amounts and kinds of residue being created. The mere statement that one-third of the tree is left in the woods leaves several vital questions unanswered.

A survey of the literature revealed that the only work suited to our purposes which had been done was a survey made in northern Missouri by the U.S. Forest Service a number of years ago, and the records of that work had been destroyed in a fire. Accordingly, a survey of hardwood logging residue in the Upper Peninsula of Michigan was conducted during the summer of 1955, by the Forest Products Research Division.

In planning the survey, it was decided that the questions to which answers would be sought should be these:

1. What volume of bark-free wood fiber is left in the woods for each thousand feet of sawlogs removed?
2. What forms does this residue material exist in, and what is the volume in each form?
3. How much residue material can be expected per acre?

Decision as to Technique . . .

Some basic decisions as to technique had to be made before the collection of field data could begin. For example, what should be the nomenclature of the various forms of residue? Another important decision concerned the method of volume determination to be used. It was felt that both weighing and liquid displacement were too cumbersome to be practical for the large number of samples required. This left measurement of length and diameter, which, while tedious when applied to limbwood, was still the only practical method for use in the field.

It was recognized that all potential users of residue materials would not have the same specifications for their raw material. Some could use the entire amount, while others could use only that which met certain requirements as to size and quality of individual pieces.

Accordingly, we decided to collect our field data in such a way that we could present resource estimates to a potential user whose requirements were for straight, surface-clear pieces 2 in. and larger in diameter, and 1 ft. and longer in length. All diameter measurements would be expressed as inside the bark, so that volumes of wood fiber only could be reported.

The adoption of these rather restrictive utilization criteria would have the added advantages of insuring that our results would be conservative, and making the measurement techniques somewhat simpler. From volume determinations made in this manner, the added amounts of material available to potential users whose requirements were less restrictive could be estimated with a fair degree of accuracy.

Since it is to be hoped that management of hardwood forest will become more widespread in the future, it was felt that the results of the survey would have more lasting value if data were taken only in managed stands. The residue created in the cutting of 500 sawlog trees in nine locations in the Upper Peninsula of Michigan was measured in the manner that I have just described.

Results of Survey . . .

Let us examine the results of the Hardwood Logging Residue Survey. It was found that there are two major classes of residue. One is that which is developed because of the form and growth characteristics of the tree itself, and consists of limbwood, topbutts, portions of the bole which were cut out, and long-butts.

The other is that which is a function of the logging operation. This class includes trees pushed over or broken off by the trees being felled, trees cut in road and trail construction but which are too small for sawlogs and logs and trees cut but left behind when the operation is finished. Class I, the tree-related class, is, of course, predictable with greater accuracy than is Class II.

Perhaps the most useful expression of volume of residue is that which is developed per thousand board feet of merchantable materials, by species. In this connection, it should be noted that there are two possible expressions of merchantability—that amount which was actually utilized, and that which would be recorded by the timber cruiser under the heading "gross volume." It is the latter definition of "merchantable" which has been used throughout this study, because it lends itself to easy adjustment to any local standards of cull or utilization.

Table I shows the amount of Class I (tree-related) residue which can be expected to be found for each thousand board feet of merchantable timber cut. The similarity between species, with the exception of beech, is of interest, and reflects the similarity in growth form and characteristics.

The figures in parenthesis are volumes available when all of the residue in addition to that which meets the test of "straight, surface-clear pieces" can be utilized. The basis for these figures was arrived at by actually cutting up several tops according to the specifications used in the survey, and then weighing separately that material which was included in the survey measurements and that which was not. The figures in parenthesis appear in the "limbwood" category because it is only there that significant differences occur.

Table I does not tell the whole story, because in addition to the Class I residue, there is always a certain amount of Class II material created in the form of trees knocked over, broken off, or otherwise damaged in felling, as well as those cut in road and trail construction but not utilized, and the logs left in the woods through oversight. This class of residue bears no relation to species, but in order to provide a sound basis for prediction of the total amount of residue to be expected in any given operation, it must be prorated over the volume removed in that operation.

Since the volumes of material included in Class II are susceptible to wide variation depending on such factors as the type of logging, care exercised by the operator, intensity of cut, and season of year, any figure given must be simply in recognition of the fact that such residue is produced on every operation, and it is not to be accepted with the same degree of confidence as figures for Class I residue. The volumes given in Table II are the averages of what was found on plots in all nine locations in which data were taken.

While Tables I and II provide the information necessary for predicting how much residue will be developed in any given logging operation, they do not indicate clearly what amounts of each class are present after logging in a typical northern hardwood stand. To show this picture, a typical stand has been synthesized on the basis of the occurrence of species on the Survey sample plots. Since beech is a component of the stand only in the eastern part of the Upper Peninsula, it was omitted from the typical stand. Table III shows the amount of logging residue per thousand board feet in a typical northern hardwood stand.

When we are considering the problem of harvesting this residue material, we are particularly interested in the amount per acre. This is arrived

at, of course, by multiplying the figures given in Tables I and II by the appropriate cut figure. Current practice in managed second-growth northern hardwood stands in the Upper Peninsula of Michigan, as shown by the survey, is quite uniform, with an average of ten trees totaling 2 M fbm being cut per acre. The amount of residue developed under these conditions is shown in Table IV.

If you would like to have a rule-of-thumb by which to predict the amount of residue which will be produced in any given hardwood logging operation, or estimate how much is present as the result of logging already finished, you can say that for each thousand board feet, gross scale, Scribner Decimal C, there will be 65 cu. ft. of wood residue in straight, surface-clear pieces, or 75 cu. ft. of wood residue if you can use it regardless of form.

You have no doubt noticed that all volumes have been expressed in cu. ft. The reason for this is that because of its wide range of sizes and shapes, residue material does not lend itself to cording, with the result that the cord has little meaning as a measure of volume.

Resources Estimates—National . . .

All of the data I have given so far is, of course, strictly applicable only in the Upper Peninsula of Michigan, because that is the only region in which measurements were made. The question is, then, "Can we safely apply the figures obtained in this survey to hardwood logging residue in other regions of the country?"

In the absence of comparable data from other regions, and hardwood trees being roughly similar in form wherever they are found, I think the answer is "Yes," with some reservations. If we recognize the conditions which cause variation in growth form, and understand how they operate to alter the figures in one direction or the other, we can use these figures as indi-

Hardwood Logging Residue Survey Summary

Conducted by Forest Products Research Division, Michigan College of Mining and Technology, Houghton, Mich., 1955.
BASIS: Measurement of residue left in woods after harvesting of 500 sawlog trees in nine locations in the Upper Peninsula of Michigan.
DEFINITIONS: Merchantable volume: Gross volume of portions of tree utilized for sawlogs (Scribner Decimal C).
Class I Residue: That residue which is a function of the tree form and growth characteristics. Consists of Limbwood, Top-Butts, Long-Butts, and Parts Cut Out.
Class II Residue: That residue which is a function of the logging operation. Consists of Trees Damaged or Pushed Over in the felling of sawlog trees, Trees Cut for Roads & Trails, and Logs and Trees Left In The Woods.
Figures in Parenthesis: These are volumes of bark-free fiber available when all of the Limbwood down to 2" in diameter can be utilized. ALL OTHER FIGURES are volumes available in straight, surface-clear cuttings down to a minimum of 1 foot in length and 2 inches in diameter.

TABLE I: CLASS RESIDUE BY SPECIES PER M fbm MERCHANTABLE
(Scribner Decimal C, Gross Volume)

SPECIES	LIMBS	TOP-BUTTS	LONG-BUTTS	PARTS CUT OUT	TOTAL
		Cubic Feet[1]			
HARD MAPLE	38.2(50.8)	11.6	9.2	.4	59.4(72.0)
YELLOW BIRCH	38.3(50.9)	10.9	2.5	.7	52.4(65.0)
SOFT MAPLE	47.0(62.5)	10.8	3.1	---	60.1(75.6)
RED OAK	40.5(53.9)	11.1	5.5	---	57.1(70.5)
BEECH	84.5	14.3	1.9	---	100.7

[1]Volume inside bark

TABLE II: CLASS II RESIDUE PER M fbm MERCHANTABLE
(Scribner Decimal C, Gross Volume)

CATEGORY OF RESIDUE	VOLUME (Cu. Ft.)[1]
TREES DAMAGED OR PUSHED OVER	2.9
TREES CUT FOR ROADS & TRAILS	2.1
LOGS & TREES LEFT IN WOODS	8.9
TOTAL	13.9

[1]Volume inside bark

RULE-OF-THUMB: If you can use all logging residue down to 2" in diameter, regardless of its form, you can expect 75 CUBIC FEET of residue material for every thousand board feet (gross scale) of logs harvested.

If you can use only straight, surface-clear pieces down to a minimum of 1' in length and 2" in diameter, you can expect 65 CUBIC FEET of residue material for every thousand board feet (gross scale) of logs harvested.

TABLE III: HARDWOOD LOGGING RESIDUE PER M fbm (Gross Scale, Scribner Decimal C Rule) IN A TYPICAL NORTHERN HARDWOOD STAND[1]

CATEGORY OF RESIDUE	VOLUME (Cu. Ft.)[2]
LIMBS	33.8(44.9)
TOP-BUTTS	12.5
LONG-BUTTS	6.3
PARTS CUT OUT	.2
TREES PUSHED OVER	2.9
LOGS & TREES LEFT IN WOODS	8.9
CUT FOR ROADS & TRAILS	2.1
TOTAL	66.7(77.8)

[1]Stand composed of 62% Hard Maple, 28% Yellow Birch, 3% Soft Maple, and 7% Red Oak.
[2]Volume inside bark

TABLE IV: HARDWOOD LOGGING RESIDUE PER ACRE WHEN THE CUT IS 2 M fbm PER ACRE IN A TYPICAL NORTHERN HARDWOOD STAND

CATEGORY OF RESIDUE	VOLUME (Cu. Ft.)[1]	
Class I		
LIMBS	67.6(89.9)	
TOP-BUTTS	25.0	
LONG-BUTTS	12.6	
PARTS CUT OUT	.4	
Sub-Total		105.6(127.9)
Class II		
TREES DAMAGED OR PUSHED OVER	5.8	
TREES CUT FOR ROADS & TRAILS	4.2	
LOGS & TREES LEFT IN WOODS	17.8	
Sub-Total		27.8
TOTAL		133.4(155.7)

cations of what the residue situation is on a national scale.

Let us examine this hardwood logging residue resource in the light of present and future pulpwood requirements. The Stanford Report gives estimates of requirements both now and in the forseeable future. It states, "Historically, the expansion of the pulp industry has been due to its ability to develop additional sources of pulping materials through modification of its processes."

Again, "Utilization factors that indicate expansion can occur without prices rising at a greater rate than prices of competing materials include: The nature of the pulping process, which permits the economical use of small-size timber and forest residues.

"The development of, and expected improvement in, semi-chemical pulping processes, which appear to be particularly well suited to hardwood pulping."

One of the most significant statements in the Stanford Report, from the standpoint of our discussion, is this, "In the East, major changes in wood supply must occur if the present level of pulp production is to be maintained."

A Look at the Future . . .

Now, where does logging residue fit into this picture? APA's executive secretary stated not long ago that pulpwood production is already at the level indicated for 1960 in the Stanford Report, so we will use these figures to represent the present situation.

The requirements for hardwood pulpwood are 460 million cu. ft. The current hardwood sawlog cut of 7.6 billion bd. ft. creates 570 million cu. ft. of residue material, or 120% of current hardwood pulpwood requirements. In other words, there is enough hardwood fiber lying around in the woods today to make all of the paper that is being made from hardwoods today.

What will be the situation in 1975? It is estimated that hardwood pulpwood requirements will have risen 75% to 810 million cu. ft. The anticipated hardwood sawlog cut at that time can be expected to create 585 million cu. ft. of residue material, or 77% of the total hardwood pulpwood requirement.

Just think what this means in terms of taking the pressure off our growing stock as we normally think of it, that is as wood in stems of trees, only. The U. S. Forest Service Timber Resource Review takes cognizance of the role of logging residue when it states, "Opportunities for expansion of pulpwood supplies lie in use of hardwoods, cull trees, and residues."

Harvesting Experiments . . .

The obvious question now, is, "If all that fiber is lying out there in the woods, why don't we go out and get it? The timberland owner should be glad to get rid of it, and the loggers have already put in the necessary roads—it ought to be a snap." The answer, of course, is that it actually isn't as simple as that.

In the first place, the form in which this residue material exists is such that it presents problems in handling. In the second place, even if you succeed in getting it out of the woods at an economical cost, what can you do with it? It ranges in size from twigs to logs, much of it is crooked, and all of it has bark on it. In other words, plenty of residue is physically available, but much of it is economically or technically inaccessible.

Problem of Handling . . .

The problem of handling hardwood logging residue from the woods to a landing is being worked on currently by the Forest Products Research Division of the Michigan College of Mining & Technology, at its Ford Forestry Center at Alberta, Mich. Here, typical hardwood logging conditions were duplicated on a 5-acre plot, and experiments in skidding the logging residue were conducted.

Since it was felt that speed in handling might be the key to successful skidding, a Ford Series 850 Industrial wheel tractor was used to skid to a landing one-half mile from the plot. It was found that while this tractor operated at a speed of only 2.2 mph in the woods, it was capable of traveling 10 mph on a logging road with a full load.

Contrary to expectations, it was found that in nearly all instances it was possible to skid a hardwood top intact, without severing limbs, and without excessive damage to the residual stand.

The tractor we used was not equipped with a winch. Many times a hardwood top which is not heavy enough to constitute a full-capacity load for the tractor would be so bulky that it was not possible to hook on to another top or a cull log to complete the load. This meant that many times the tractor made the trip to the landing with less than an economical load. A winch is deemed just as essential to the employment of a wheel tractor as it is to a crawler tractor.

Based on the experience gained in this experiment, together with past experience with a larger wheel-tractor, the FWD Blue-Ox, we have synthesized an operation employing four Ford-type tractors, each equipped with a winch, which would bunch for a large wheel tractor which would operate on logging roads. It is calculated that such an operation could move 10 to 12 tons of residue material per hour to a landing one-half mile distant at a cost of $2.20 per ton. It is hoped that an operation of this type can be tested this coming year.

Problem of Bark Removal . . .

With the movement of residue material to a landing at reasonably low cost, the problem is only partially solved. This residue is essentially in the same form and condition as it was when it was lying in the woods. It is felt that with volumes on the order of 10-tons per hour coming into a landing, mechanical means for breaking it down can be economically employed, but we are still left with the problem of getting rid of the bark.

The bark problem is a serious one, but it is believed that the potentialities of logging residue as a source of hardwood fiber justify the considerable amount of research that is required on the bark problem. Three major avenues of attack are possible:

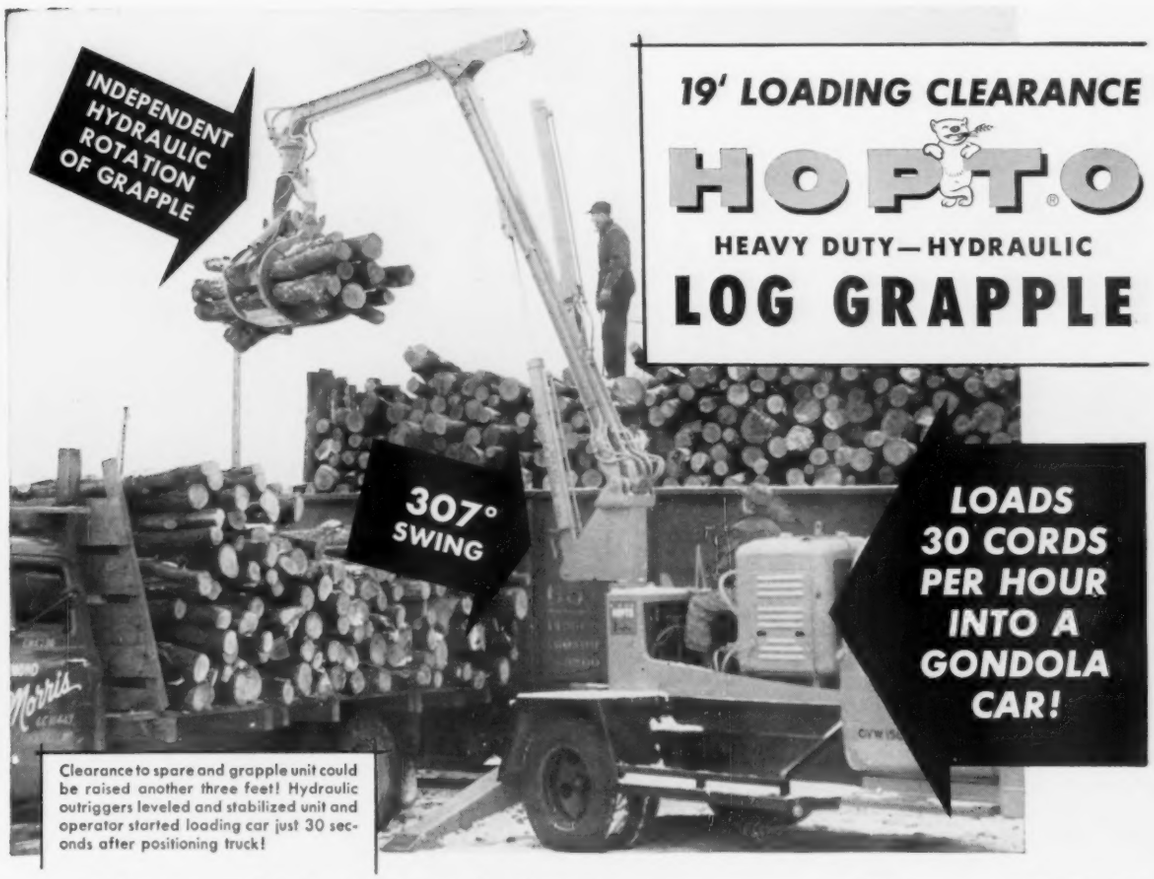
1. Develop a mechanical debarker which will handle crooked material from 2 to 24 in. dia. in random lengths. The problems in connection with this line of attack seem insurmountable in the light of present knowledge.

2. Pulp makers can develop pulping processes which will economically utilize wood with bark attached. I am aware of the problems in this line of attack, but when one views the developments of recent years, he is justified in the hope that something commercially acceptable can be accomplished in this line.

3. Suitable means for separating and segregating bark from wood after chipping can be developed. At present, this seems to be the most promising line of attack. Work is already underway, and more is planned in the field of bark-chip separation.

In closing, let me reiterate my belief that the importance of hardwood logging residue in relation to current and future supplies of raw material for the pulp and paper industry justifies, even demands, intensive research on the problems to be solved before complete utilization can be realized.

I would like to propose that the American Pulpwood Assn. consider assuming the role of sponsor and coordinator of research on these problems by as many agencies as can profitably be employed.



Clearance to spare and grapple unit could be raised another three feet! Hydraulic outriggers leveled and stabilized unit and operator started loading car just 30 seconds after positioning truck!

Badger backs up the claim of cutting handling costs with proof! You can prove it yourself . . . show a *worthwhile, measurable* difference . . . shrink handling costs of pulpwood to a fraction of previous costs! Here's how you can:

PROVE IT by cycling time and swing! With a 307° *continuous* swing and a *20* second cycling time you handle more loads per hour and boom swing is automatically cushioned for faster, *safer* starts and stops!

PROVE IT by independent rotation of grapple! Rotation of loaded grapple is done during boom swing so load is in position for uniform piling at completion of cycle . . . and ready to take a new, *big, fast* 'bite' at other end of cycle!

PROVE IT by loading height! You have a *full 19' clearance* for every loading or stockpiling operation.

PROVE IT by mobility and set up time—HOPTO mounts on any ton and a half or larger truck . . . quickly moves from one location to another. Independently controlled outriggers level and stabilize unit, *from operator's seat* . . . unit is ready to operate *within 30 seconds.*

PROVE IT by its outstanding safety features, the heaviest-duty, largest GPM hydraulic system in the field . . . and the proven engineering features that have made a digger-shovel-crane adaptation of the HOPTO 307 the standard of comparison in the construction industry!

WRITE TODAY for complete information and specifications on the HOPTO 307. Compare HOPTO with any other unit and you will know why HOPTO *is* the difference between profit and loss on your pulpwood handling problems.

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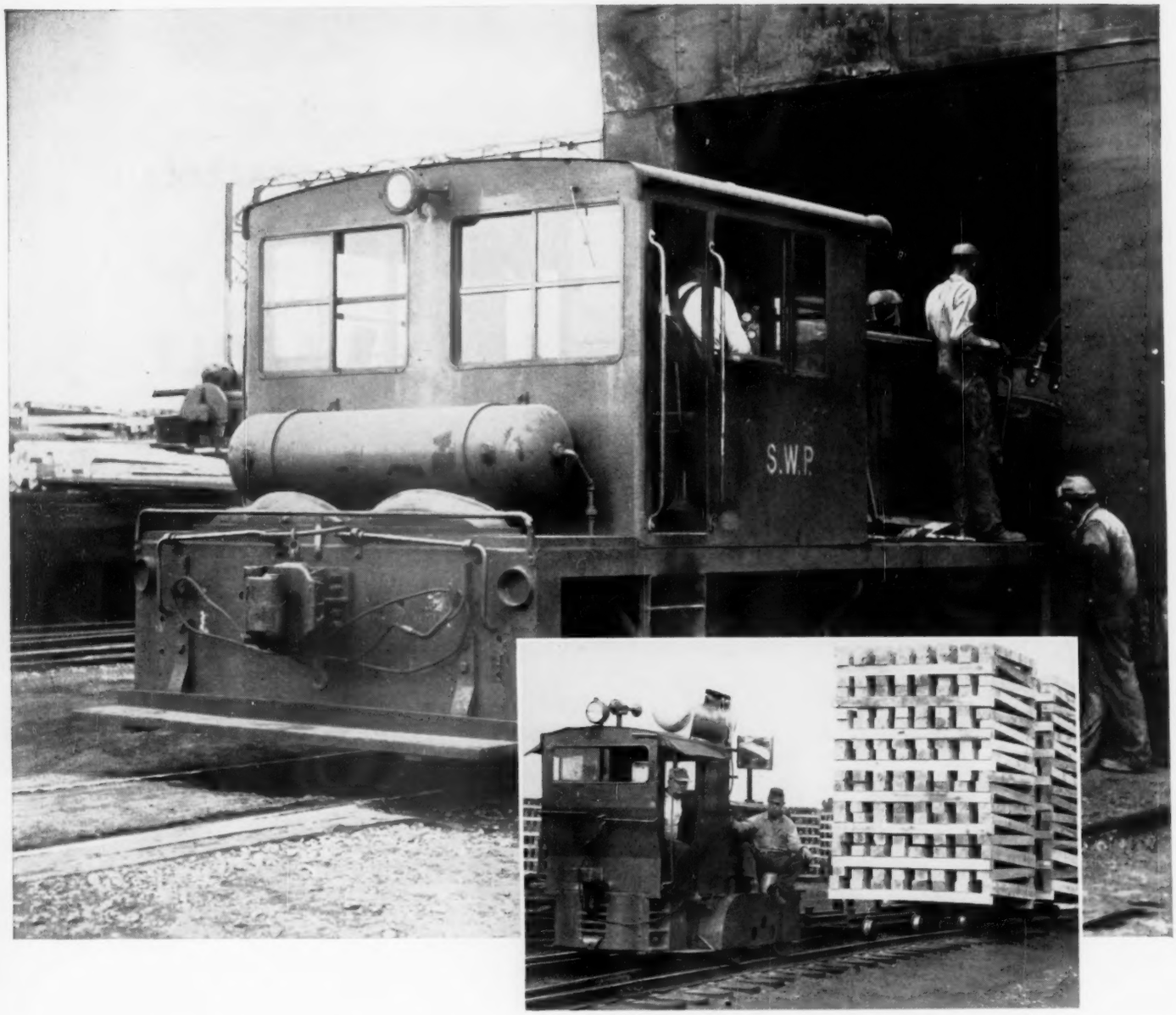
WINONA, MINNESOTA • Dept. X

Manufacturers of a complete line of heavy-duty, completely hydraulic grapples, cranes, diggers and shovels. One of the twelve models for wheel or track-type tractor mounting, for truck mounting, or complete wheel or track units is exactly right for your handling problems.

Independently operated rotator immediately above grapple positions unit *for any angle . . . at any height up to 19' clearance!*



Southern Wood Preserving Company cuts costs...
by "Matching the Plymouth to the Job!"

This alert manufacturer knows how to make hauling and switching economical!

Knowing that most efficient performance is best assured by using a locomotive *expressly designed to fit specific haulage needs*, the firm has invested in *two* Plymouths.

"We are very well satisfied," says Harry Dunstan, vice president. "We use our 40-ton Plymouth Diesel with Torqomotive Drive for hauling up to 18 loaded freight cars over our 5-mile track. And for smooth switching of ties, we use our 8-ton Plymouth—re-powered with torque converter. Both perform up to 50 hours a week."

Whatever size you choose, your Plymouth locomotive gives you welcome benefits like these:

Extra reserve power—handling maximum loads without slip or strain—giving bonus years of haulage life

Easy-reach controls—conveniently placed for "finger-tip" operation

Lower per-ton-mile costs—through Plymouth-engineered features that also cut maintenance, reduce down-time

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Optional "Torqomotive" Drive—Plymouth's automatic torque converter assuring shock-free handling, safe hauling of any load

We will gladly send you complete information on a Plymouth built specifically to your needs—just send us a brief outline of your haulage operations. Address: The Fate-Root-Heath Company, Dept. A-27, Plymouth, Ohio.

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WITH TORQOMOTIVE DRIVE

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REVIEW OF ASSOCIATION ACTIVITIES

• Since its organization 23 years ago, the American Pulpwood Association has remained the only national organization representing both producers and consumers of pulpwood. Its program is set up and carried out to keep this industry posted on national legislation affecting its operations, production and procurement methods, equipment, labor training aids, and programs, improved utilization methods, conservation, and good forest management practices.

Rapid growth is again the most outstanding characteristic of our Association, as of our industry, this past year. This growth is evident in our membership, our job load, and, of necessity, in our staff. The most significant aspects of Association growth in stature and responsibilities during 1956 are:

1. APA has now been recognized formally by both the American Paper and Pulp Association and the National Paperboard Association as the primary agency for our entire industry in acting for and speaking on forestry and pulpwood matters at national levels.

2. These same associations have, at the same time, turned over to APA the responsibility for collecting, compiling, and distributing pulpwood statistics.

3. APA has prepared itself during the past two years for broader industry support by strengthening its services and by changing its policy of membership on the Board of Directors so as to more equitably accommodate the pulpwood consuming industries nationally.

4. Good communications are necessary if we are to have constructive relations. In this connection we can report substantial improvement in our communications with the U.S. Forest Service and the Department of Agriculture during the past year. The atmosphere for a more constructive and fruitful relationship was definitely stimulated by informal discussions with top representatives of these agencies at a Board of Directors' meeting last Fall. It is hoped that this type of meeting, where informal discussions and deliberations breed understanding and confidence, will set a precedent for the future.

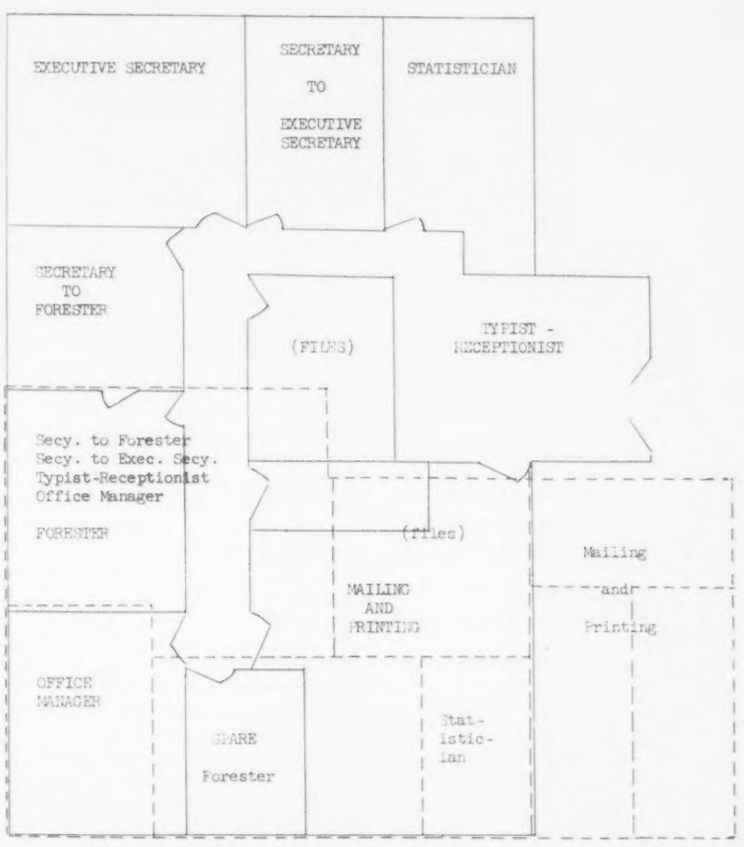
Together with this expanded Association program has come a parallel growth in Association membership. The past year resulted in a 6% membership increase. The Association currently can include in its membership rolls about 126 pulp mills that consume close to 80% of all the pulpwood in the United States.

Any organization that expands membership while it represents an expanding industry is, of course, faced with problems of administration. Our need for more staff assistance was met last year by the addition of a Forester to guide the legislative and forestry programs. This year an additional Forest Engineer was engaged to serve the Appalachian Region in particular, and to assist with some of the Southeastern work of the Technical Committees and with the mechanization program in general. Expanded membership and activities have also required additional office space and office staff, which have been provided to meet the growing need of this industry.

Each year we possess a larger fund of cumulative knowledge in all facets of wood procurement and forest management. Past accomplishments are no criteria for what can be done in the future. Individually and as an Association we must, therefore, be alert to all such matters and be prepared to measure their import regionally and nationally. Ways and means of doing this in cooperation with responsible established committees or other associations are the responsibility of the APA staff. With the help of industry members, the staff stands ready to provide the leadership and guidance that will keep this industry growing and harvesting pulpwood for this and future generations.

Legislative Highlights—1956

As has been the case during the past several years, the major legislative activity of the Association during 1956 centered around legislation



NEW OFFICES FOR APA. The solid lines outline the area of new American Pulpwood Association office in Room 2012. Shown in broken lines is the area of the old office in Room 1712. In CAPITAL LETTERS are shown present locations of staff; in small letters, old locations.

proposing to amend the Fair Labor Standards Act. Of primary concern to this industry were proposals to eliminate both the 12-man and the seasonal exemption provisions under this Act. Although the proponents of this legislation were not successful during the 84th Congress, it is obvious from legislation introduced to date in the 85th Congress that most of the major issues of interest to the pulpwood industry are the same ones that have been with us for some time. In keeping with its Board-approved policy, the Association will continue to spearhead opposition to the proposals to expand coverage.

Other legislation in which the Association has taken an active interest covered such subjects as forest products price reporting, rulings by the Internal Revenue Service relating to timber, premerger notification legislation, immigration, depressed areas, the tree planting planting program under the Soil Bank Act, Wilderness Preservation System legislation, Forest Service Annual Report, Federal-State Land Study Commission.

Mechanization Program

The five regional Technical Committees, composed of individuals involved in pulpwood production and procurement for their respective companies, meet at least twice a year for a clinical discussion of operating procedures and equipment. Meetings may be devoted to consideration of a specific method, machine, or operation, or to a topic of general interest to the region concerned. Most meetings include as part of the program a technical review of wood preparation, hauling and handling equipment, training, safety, and supervision, and industrial forestry. A glance of the 1956 schedule below will give a good insight into the range of subjects covered by these Technical Committees.

Lake States

May—Light Tractors; Multiple Use of Forest Lands

September—Technical Review with Emphasis on Light Equipment for Small Producers

Appalachian

July—Hammermill's Canadian Pulpwood Operations

October—Scaling Pulpwood by Weight

Southeast

April—Pine Seedling Supply and South-Wide Planting Program

November—Forest Site Preparation Prior to Planting

Southwest

April—Manpower Requirements for Pulpwood Production

October—Chip Handling and Transportation

Northeast

June—Hardwood Pulpwood Processing

October—Skidding, Loading and Chip Volume Measurement

To keep our membership further advised on the development, availability, and application of new equipment, APA Forest Engineers prepare Releases for the APA Equipment Handbook. Supplemented in most cases by photographs, drawings, and observations of the equipment in actual operation, these Releases serve to keep members posted on machines and methods designed to increase production and at the same time decrease unit cost. Topics covered by Equipment Handbooks include:

Saws
Loading & Handling
Peelers & Barkers
Tractors
Trailers
Logging-General
Fire Protection
Railroad Transportation
Tree Planting
Water Transportation
Sulkys and Arches
Rigging
Slasher Mills
Trucks
Forestry-General
Mill & Yard
Hand Tools
Camp and Repair
Road Construction & Maintenance
Miscellaneous

A listing of Equipment Handbook Releases issued during 1956 appears on this page.

Safety and Training

Although 1956 did not see the completion of any additional Training Guides and accompanying Workers' Notebooks, several are in process of being prepared in the hope that they will be available during the coming year to add to the present series of:

1. Training Manual
2. Training Guide No. 1—covering foreman training, including the Foreman's Notebook
3. Training Guide No. 2 on Use and Care of Axes
4. Training Guide No. 3 on Use and Care of Pulpwood Hand Saws and the Pulpwood Cutters' Notebook
5. Training Guide No. 4 on Use and Care of Power Saws with the Power Saw Operators' Notebook

EQUIPMENT HANDBOOK RELEASES ISSUED DURING 1956

No.	*Subject*
252	The "Cambio Barker"—Progress Report
253	Cambio Debarker
254	Progress Report—Briquetting Planer Shavings for Pulp
255	Notes on Review Draft of Stumpage Appraisal Chapter of USFS Manual
256	The Utilization of "Waste Wood" in the Northeast
257	Hiabob Pulpwood Loader (Progress Report)
258	Circular Pulpwood Saw with Recoil Starter
259	Traction Chains for Farm-Type Rubber-Tired Tractors
260	Push-Plate for Pulpwood Unloading with a Small Tractor
261	Volume and Weight Findings
262	National School of Heavy Equipment Operations
263	The Hosmer Slab Debarker
264	Brown Company's Sling Unloading Method for 4-Foot Pulpwood
265	Pulpwood Unloading System
266	Measuring Wood in Moving Conveyors
267	Typical Use of Radio Communications in the Northeastern Pulpwood Logging Industry
268	The Talkie-Tooter
269	"Southworth" Brush Cutter
270	Para-Tone Colors
271	Little Beaver Slab Debarker
272	Jackson "Beaver" Whole Log Debarker
273	Safety Belts for Trucks and Cars
274	The Hellerud Air Motor Tagline
275	"Gander" Hard Toe Woodsmen's Boot
276	"Nesco" Slashmobile
277	Jeep Logger Package Unit
278	A Folding Spudder for Tree Planting
279	Reviews "Airphoto of Pulpwood in Water Storage"
280	Self Unloading Truck
281	Phelps Chip Blower System
282	Wood Chip Cars
283	Cambio 26" Log Debarker—Progress Report
284	Carthage Slab Debarker—Progress Report #1

(both English and French versions)

6. Training Guide No. 5 on Chemical Debarking of Trees with the Chemical Debarkers' Notebook

7. Training Guide No. 6 on Animal Skidding with Workers' Notebook

Through APA's Safety and Training Officer and the Regional Forest Engineers, safety and training sessions were conducted in almost every section of the country. Such sessions were conducted not only indoors but also on the job for crews of dealers and contractors. Some time was also spent conducting similar sessions for forestry colleges, and exhibits and papers were prepared and presented at forestry field days.

Conservation and Forestry

Another important part of the APA involved publication of Forest Notes containing forestry items of interest. During 1956 these Forest Notes highlighted:

Forest Fire Insurance
Timber Sales
Tree Planting
Forest Service Appropriations
National Forest Timber Harvest
Highlights of the Soil Bank Act
Analysis of the Timber Resource Review Preliminary Draft
Federal Taxation of Income from Timber

Directory of Research

During 1956 work was begun on preparation of a Directory of Research in the Growing and Harvesting of Pulpwood. Preparation of this Directory was a joint project undertaken by APA and the State University of New York College of Forestry at Syracuse, under a research fellowship sponsored by APA. This Directory will contain over 900 reports of research being carried on by all types of private and public agencies interested in forest resource management in the United States and its possessions. A full page is devoted to the description of each project.

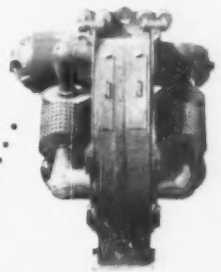
Research studies dealing with the subjects of genetics, direct seeding, artificial reforestation, killing of undesirable trees and shrubs, chemical debarking, and the effect of intermediate cuttings on subsequent growth are heavily represented. The Directory should prove to be invaluable to numerous foresters whether they are research workers or woodlands managers. Some of its main purposes are to stimulate cooperation between research foresters and to prevent unnecessary and costly duplication of research efforts. Plans are underway for the release of this Directory during the first half of 1957.

Membership

Any organization or individual engaged in the forest products industries is eligible to one of the classes of membership provided by APA. Membership is divided into Industry (voting) and Subscriber and Overseas (non-voting) classes. Industry class is made up of the companies and individuals engaged in pulpwood production and consumption in the United States. Subscriber Class is composed primarily of manufacturers of equipment used in pulpwood logging and individuals engaged in other forest products industries in the United States, as well as Canadian and Mexican pulpwood producers and consumers. The Overseas Class, as its name implies, includes those outside the United States, Canada, and Mexico interested in keeping posted on development in the U.S. pulpwood industry.

Membership in all classes increased during 1956 to the point where over 300 separate memberships involve mailings to close to 1,100 individuals. It is interesting to note that the Overseas Class, adopted just three years ago, now includes firms in Finland, Australia, France, Ireland, Sweden, New Zealand, Norway, and Great Britain.

SEE THIS NEW FILM IN YOUR OWN OFFICE . . . Shows Pulpwood Feeder, infeed chain conveyor with hold-down for 4' and 5'3" Pulpwood, 21" Cambio Barker, Outfeed Conveyor with same hold-down. Write for film — 16mm.



the Soderhamn
CAMBIO*
Pulpwood Barker

has now undergone rugged tests in various installations throughout the nation on 4′ as well as 8′ wood. Experience from improvements, specifically on the debarking tools, guarantees satisfactory barking even in sub-zero temperatures. A new automatic bark cutter is an improvement over earlier models.

You can use the CAMBIO Barker for EITHER pulpwood or sawlogs.

* Reg. U. S. Pat. Off. Numbers— 2,623,558 2,738,996 2,775,274 2,785,715 2,786,499 2,787,384 2,788,034

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Soderhamn D-3 low cost Barker; Soderhamn D-4 Slab Barker-Chipper; HF-60 and HF-30 Slab Chippers; Soderhamn CS-90C and CS-35 Chip Screens; 26" Dixie Gang Saws, and other efficient machines for forest industries. Direct factory service and engineering. Performance guaranteed. For further information, write:

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OLIVER OC-12

KING-SIZE PRODUCER

because of *full-time* power... even on turns!

The new Oliver OC-12 is cut out for woods work—offering you a pulp-hustling advantage not found in any other tractor of its size.

It has POWER-TURN steering. This is the advanced steering system that means business—because it keeps full engine power on both tracks at *all* times. Sharp turns, gradual turns, *any* and *all* turns are made with two-track, full-time power.

Imagine the benefits of this Oliver exclusive in added production every day! You winch heavier loads... keep them coming without letup... maneuver through the tightest working areas faster because every turn is made with equal traction as straightaway.

There's a steady dependability to the Oliver OC-12 that adds even more to its king-size profit returns. Efficient, high-torque diesel or gasoline 61 h.p. engine. Make a date with your Oliver Distributor for job-testing the OC-12.

Want to be shown? Sit down with all the reasons the OC-12 can pay off better in your logging operation. This picture-filled book has answers to all your questions. Ask for Bulletin I-1047.

OLIVER

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400 West Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors and matched allied equipment.

ORGANIZATION AND PROGRAM FOR 1957-58

• The American Pulpwood Association will continue to strive for improvement to pulpwood preparation, loading, and production in general during the coming year. Its long-term objectives are:

(1) To conduct the Association in such a manner that it will guide and help the pulpwood industry to obtain pulpwood at the lowest cost, the highest quality and in adequate amounts now, and for future generations.

(2) To serve the entire pulpwood industry in our national programs of legislation, mechanization, training and safety and the intensive management of company forest lands.

(3) To encourage all members to prepare now for the predicted increase in consumption of pulpwood likely to occur during the next 10 to 20 years.

Board of Directors

The work of the Association is carried out by the Staff along the lines and policies laid down by the Directors of the Association. These men were elected by the Industry Members of the Association at their Annual Meeting on February 19, 1957, in New York City.

APPALACHIAN REGION
W. J. Bailey
West Virginia Pulp & Paper Co.
New York, N.Y.
R. R. Edgar
Bowaters Southern Paper Corp.
Calhoun, Tenn.
D. E. Hess
Glatfelter Pulp Wood Co.
Gettysburg, Pa.

LAKE STATES REGION
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Kimberly-Clark Corp.
Neenah, Wisc.
G. B. Amidon
Minnesota & Ontario Paper Co.
International Falls, Minn.
H. R. Palmquist
Marathon Corp.
Neenah, Wisc.

NORTHEASTERN REGION
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Great Northern Paper Co.
Bangor, Maine
F. E. Pearson, Jr.
Eastern Pulp Wood Co.
Calais, Maine
D. B. Demeritt
Dead River Co.
Bangor, Maine

SOUTHEASTERN REGION
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Savannah, Ga.
S. K. Hudson
Container Corp. of America
Brewton, Ala.
T. W. Earle
Continental Can Co., Inc.
(Gair Woodlands Corp.)
Savannah, Ga.

SOUTHWESTERN REGION
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Gaylord Container Corp.
Bogalusa, La.
R. M. Buckley
East Texas Pulp & Paper Co.
Silsbee, Texas
R. W. Wortham
Southland Paper Mills
Lufkin, Texas

WESTERN REGION
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Fernandina Beach, Fla.
C. V. Sahlin
Puget Sound Pulp & Timber Co.
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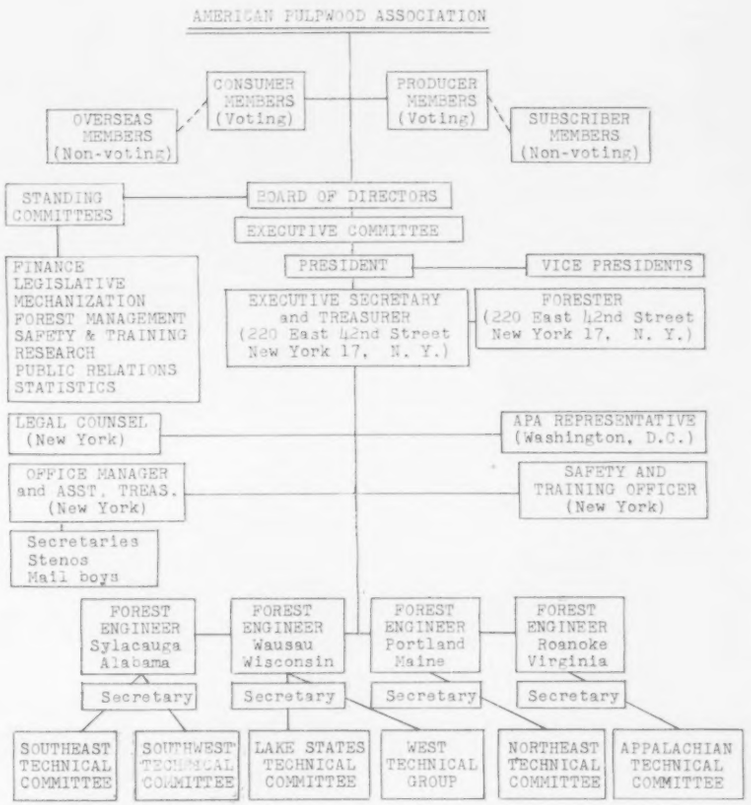
North Carolina Pulp Co.
Plymouth, N.C.
K. A. Swenning
Scott Paper Co.
Chester, Pa.
H. V. Hart
St. Regis Paper Co.
Deferiet, N.Y.
W. J. Damtoft
Champion Paper & Fibre Co.
Canton, N.C.
W. M. MacConnachie
Northwest Paper Co.
Cloquet, Minn.



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Wisc. Rapids, Wis.
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C. S. HERR
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Halifax Paper Co., Inc.
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C. E. WILDS
Olin-Mathieson Chemical Corp.
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L. A. WHITTLE, *ex officio*
Brunswick Pulp & Paper Co.
Brunswick, Ga.

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Brunswick Pulp & Paper Co.
Brunswick, Ga.

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New York 17, N.Y.

Assistant Treasurer

HELEN L. KOHLER
220 East 42nd St.
New York 17, N.Y.

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New York 17, N. Y.

Safety and Training Officer

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New York 17, N.Y.

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J. A. ALTMAN
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ADVISORS—1957

Counsel

DUNNINGTON, BARTHOLOW & MILLER
161 East 42nd St.
New York 17, N.Y.

Washington Representative

T. H. MULLEN
711-14th St., N.W.
Washington, D.C.

Standing Committees

Standing Committees are set up to function as advisory groups who study the problems, and recommend solutions and courses of action to the Board of Directors, Officers, or Staff, in the respective fields of interest outlined for the responsibility of each committee, in regard to matters affecting the Association in particular and the industry in general.

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New York, N.Y.
R. W. LYONS
Kimberly-Clark Corp.
Neenah, Wis.
J. T. MAINES
Great Northern Paper Co.
Bangor, Maine
W. J. BRIDGES, JR.
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Gaylord Container Corp.
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K. A. SWENNING
Scott Paper Co.
Chester, Pa.
G. B. AMIDON
Minnesota & Ontario Paper Co.
International Falls, Minn.
B. L. ORELL
Weyerhaeuser Timber Co.
St. Paul, Minn.
L. A. WHITTLE, *ex officio*
Brunswick Pulp & Paper Co.
Brunswick, Ga.

Between meetings of the Board of Directors, the Executive Committee, consisting of nine members of and appointed by the Board, has and may exercise all of the powers of the Board of Directors subject only to the general approval and supervision of the Board.

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S. D. Warren Co.
Cumberland Mills, Me.
WILLIAM HILTON
Great Northern Paper Co.
Bangor, Maine
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Olin-Mathieson Chemical Co.
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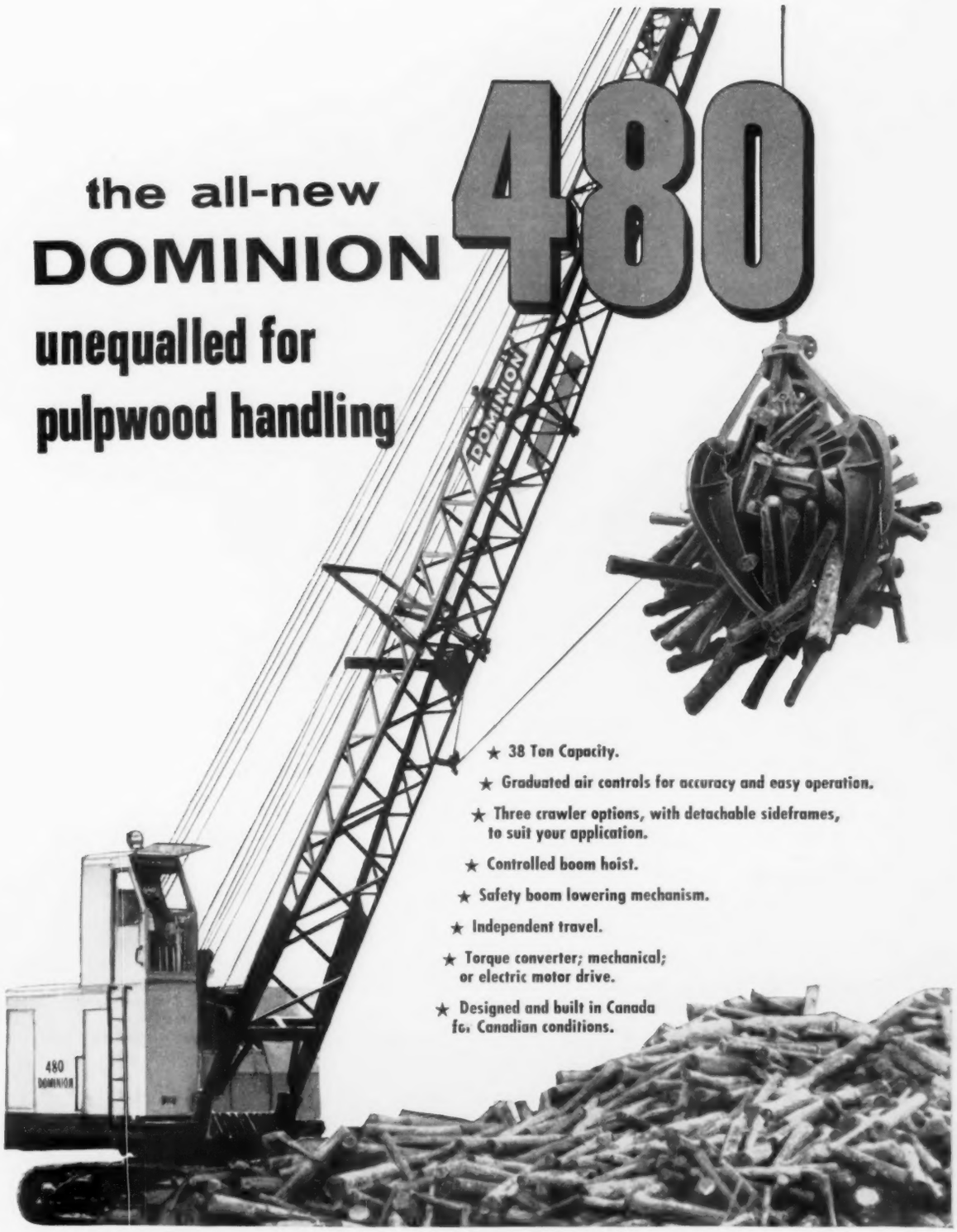
Chillicothe, Ohio
D. Y. LENHART
West Virginia Pulp & Paper Co.
New York, N.Y.

Passes on its recommendations on all questions of policy and major decisions in reference to finance matters of the Association. This includes consideration of the annual budget of the Association, any questions in regard to assessments, and other financial matters.

LEGISLATIVE COMMITTEE

K. A. SWENNING, *Chairman*
Scott Paper Co.
Chester, Pa.
F. E. PEARSON, JR.
Eastern Pulp Wood Co.
Calais, Maine
J. T. MAINES
Great Northern Paper Co.
Bangor, Maine
R. M. BUCKLEY
East Texas Pulp & Paper Co.
Silsbee, Texas
A. G. CURTIS
Gaylord Container Corp.
Bogalusa, La.

the all-new DOMINION 480 unequalled for pulpwood handling



★ 38 Ton Capacity.

★ Graduated air controls for accuracy and easy operation.

★ Three crawler options, with detachable sideframes, to suit your application.

★ Controlled boom hoist.

★ Safety boom lowering mechanism.

★ Independent travel.

★ Torque converter; mechanical; or electric motor drive.

★ Designed and built in Canada for Canadian conditions.

POWER CRANE & SHOVEL DIVISION

DOMINION ENGINEERING

COMPANY LIMITED

MONTREAL • TORONTO • WINNIPEG • CALGARY • VANCOUVER

L. J. KUGELMAN
International Paper Co.
New York, N.Y.
EARL PORTER
International Paper Co.
Mobile, Ala.
M. H. COLLET
Olin-Mathieson Chemical Co.
W. Monroe, La.
L. A. WHITTLE
Brunswick Pulp & Paper Co.
Brunswick, Ga.
C. G. MCLAREN
Owens-Illinois Glass Co.—Mill Div.
Toledo, Ohio
W. J. BRIDGES, JR.
Union Bag-Camp Paper Corp.
Savannah, Ga.
G. L. SNOWDEN
The Mead Corp.
Chillicothe, Ohio
S. N. MOE
Kimberly-Clark Corp.
Neenah, Wisc.
W. M. MACCONNACHIE
Northwest Paper Co
Cloquet, Minn.
B. L. ORELL
Weyerhaeuser Timber Co.
St. Paul, Minn.
W. J. DAMTOFT
Champion Paper & Fibre Co.
Canton, N.C.
E. F. O'HARA
Armstrong Forest Co.
Johnsonburg, Pa.
D. Y. LENHART
West Virginia Pulp & Paper Co.
New York, N.Y.
M. G. RAWLS
St. Regis Paper Co.
Jacksonville, Fla.

Makes recommendations in regard to such actions and proceedings as may be authorized by the members of the Association, or its Board, with reference to any and all existing or proposed legislation and regulations and interpreting the same which may affect or be applicable to the pulpwood industry or any part thereof.

SAFETY AND TRAINING COMMITTEE

R. F. BOWER, *Chairman*
Hammermill Paper Co.
Erie, Pa.
H. J. DEABAY
Great Northern Paper Co.
Sheridan, Maine
B. A. MCMAHON
East Texas Pulp & Paper Co.
Silsbee, Texas
C. A. STRICKLAND
Gaylord Container Corp.
Bogalusa, La.
M. D. LAMBELL
International Paper Co.
Mobile, Ala.
G. D. ELLIS
Scott Paper Co.
Waterville, Me.
R. M. GILMORE
Rayonier Inc.
Hoquiam, Wash.
C. M. MATHEWSON
St. Marys Kraft Co.
St. Marys, Ga.
E. J. ANDERSON
Marathon Corp.
Houghton, Mich.
G. F. LARRABEE
St. Regis Paper Co.
Bucksport, Me.
B. M. OYSTER
Weyerhaeuser Timber Co.
Tacoma, Wash.

Coordinates and advises the Board and Officers in reference to the program and activities of the Association, as it deals with training, safety, and supervision of manpower used in connection with the production and transportation of pulpwood.

FOREST MANAGEMENT COMMITTEE

G. B. AMIDON, *Chairman*
Minnesota & Ontario Paper Co.
International Falls, Minn.
C. S. HERR
Brown Company
Berlin, N.H.
D. B. DEMERITT
Dead River Co.
Bangor, Maine
M. S. STANDISH
Hudson Pulp & Paper Co.
Augusta, Maine
J. L. HARTRANFT
Oxford Paper Co.
Rumford, Maine
JOHN RAEBURN
Coosa River Newsprint Co.
Coosa Pines, Ala.
F. C. GRAGG
International Paper Co.
Georgetown, S.C.
P. F. HURSEY
Southland Paper Mills
Lufkin, Texas
W. D. SMITH
Buckeye Cellulose Co.
Foley, Fla.
E. P. DAVIS
Rayonier Inc.
Fernandina Beach, Fla.
TRUMAN PEASE
St. Marys Kraft Co.
St. Marys, Ga.
E. S. HURD
Consolidated Water Power & Paper Co.
Rhinelander, Wis.
R. W. LYONS
Kimberly-Clark Corp.
Neenah, Wis.
B. G. BUELL
Marathon Corp.
Green Bay, Wis.
F. N. FIXMER
Mosinee Paper Mills Co.
Mosinee, Wis.
E. C. RETTIG
Potlatch Forests, Inc.
Lewiston, Idaho
PAUL DUNN
St. Regis Paper Co.
New York, N.Y.
E. F. HEACOX
Weyerhaeuser Timber Co.
Tacoma, Wash.
R. R. EDGAR
Bowaters Southern Paper Co.
Calhoun, Tenn.
A. C. SHAW
Champion Paper & Fibre Co.
Hamilton, Ohio
R. C. BAIRENBROCK
The Mead Corp.
Chillicothe, Ohio
A. L. BENNETT
Armstrong Forest Co.
Johnsonburg, Pa.
D. E. HESS
Glatfelter Pulp Wood Co.
Gettysburg, Pa.

Makes recommendations in regard to cooperating with and furnishing aid to government agencies and others in establishing policies and in carrying out practical measures of conservation of forest resources, especially as they affect growing and harvesting of pulpwood.

RESEARCH COMMITTEE

P. T. LANNAN, JR., *Chairman*
West Virginia Pulp & Paper Co.
Georgetown, S.C.
E. L. GIDDINGS
Penobscot Chemical Fibre Co.
Great Works, Maine
R. M. TRUE
S. D. Warren Co.
Cumberland Mills, Maine
GILBERT STEWART
Coosa River Newsprint Co.
Coosa Pines, Ala.
J. B. CARLAW
International Paper Co.
New York, N.Y.
TRAVIS MCCLENDON
Olin-Mathieson Chemical Co.
W. Monroe, La.
T. M. COURTNEY
Buckeye Cellulose Co.
Foley, Fla.
L. J. FOREST
Rayonier Inc.
Hoquiam, Wash.
R. V. MALECKI
Union Bag-Camp Paper Corp.
Savannah, Ga.

52 drawbar hp
16,500 lb (approx. as shown)

HD-6 WOODS ABILITY
puts more logs at the landing

The HD-6 crawler tractor offers loggers top production and reliability that pays off on all kinds of work in the woods.

BUILT TO TAKE THE STRAIN OF LOGGING—all-steel Box-A Main Frame forms a strong backbone that means longer crawler tractor life . . . provides strength and stamina to bring out bigger logging loads day after day over the toughest terrain.

EASIER LUBRICATION SAVES TIME, PROTECTS EQUIPMENT—truck wheels, idlers and support rollers need lubrication only at 1,000-hour intervals . . . eliminates daily care of these parts. That's an extra half hour available for production every day.

MAJOR SERVICING IS SIMPLE, FAST—construction of the Allis-Chalmers HD-6 allows quick removal of major assemblies without disturbing adjacent assemblies. Cuts downtime to a minimum and turns service hours to logging hours.

The Allis-Chalmers HD-6 is giving loggers a new idea of what to expect from a tractor in its size range. Ask your Allis-Chalmers construction machinery dealer for details. Allis-Chalmers Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

J. B. Millar
Kimberly-Clark Corp.
Neenah, Wis.
J. V. Martin
Marathon Corp.
Meridian, Miss.
Robert DeLong
St. Regis Paper Co.
Tacoma, Wash.

Provides source of advice with reference to any projects involving research into the production of pulpwood or closely related fields. Usually the recommendations of this group would be made jointly with one of the other Standing Committees if the research projects under consideration deal specifically with functions covered by other Standing Committees.

PUBLIC RELATIONS COMMITTEE

Frank Heyward, Jr., *Chairman*
Gaylord Container Corp.
Bogalusa, La.
D. A. Hunter
Diamond Match Co.
Plattsburg, N.Y.
L. A. Beeman
Finch, Pruyn & Co.
Glens Falls, N.Y.
C. C. Young
Pejepscot Div., Hearst Pub. Co.
Brunswick, Maine
R. H. Cutting
Keyes Fibre Co.
Waterville, Maine
George McLennan
Racquette River Paper Co.
Potsdam, N.Y.
John Tower
International Paper Co.
New York, N.Y.
C. A. Olsson
Chesapeake Corp.
West Point, Va.
N. W. Sentell
Southern Advance Div. Robert Gair Co.
Hodge, La.
J. B. Lattay
Riegel Paper Corp.
Bolton, N.C.
B. E. Allen
Union Bag-Camp Paper Corp.
Savannah, Ga.
K. F. Adams
Halifax Paper Co.
Roanoke Rapids, N.C.
H. F. Bins
Hoberg Paper Mills
Green Bay, Wis.
Troy Knowles
Crandon Paper Mills Co.
Ft. Madison, Iowa
C. L. Dostal
Thilmany Pulp & Paper Co.
Kaukauna, Wis.
R. W. Olin
Potlatch Forests, Inc.
Lewiston, Idaho
J. M. Brewster
St. Regis Paper Co.
Pensacola, Fla.
C. L. Martin
D. M. Bare Paper Co.
Roaring Spring, Pa.

Provides advice to the Board and Officers of the Association in reference to any program, activities, or publications which are directed to the attention of the general public in regard to the production of pulpwood.

MECHANIZATION COMMITTEE

D. W. Sowers, Jr., *Chairman*
West Virginia Pulp & Paper Co.
Hancock, Md.
M. J. Quinn
Brown Company
Berlin, N.H.
J. T. Maines
Great Northern Paper Co.
Bangor, Maine
R. W. Merrill
Penobscot Chemical Fibre Co.
Great Works, Maine
E. C. Melcher
S. D. Warren Co.
Cumberland Mills, Maine
T. N. Busch
International Paper Co.
Mobile, Ala.
F. E. Stabler
Scott Paper Co.
Mobile, Ala.
R. L. Moodie
Scott Paper Co.
Waterville, Maine
H. H. Howard
Johns-Manville Products Corp.
Natchez, Miss.
S. K. Hudson
Container Corp. of America
Brewton, Ala.
J. B. Johnson
Union Bag-Camp Paper Corp.
Franklin, Va.
N. R. Harding
Georgia Kraft Co.
Rome, Ga.
T. G. Harris
Halifax Paper Co.
Roanoke Rapids, N.C.
A. J. Auden
Abitibi Corp.
Alpena, Mich.
A. F. Koller
American Box Board Co.
Fiber City, Mich.
John Hanson
Watervliet Paper Co.
Clare, Mich.
Henry Ard
Potlatch Forests, Inc.
Lewiston, Idaho
Matt Zoffel
St. Regis Paper Co.
Tacoma, Wash.
T. A. Walbridge
Bowaters Southern Paper Corp.
Calhoun, Tenn.
H. L. Setzer
Champion Paper & Fibre Co.
Canton, N.C.

Provides for the coordination of the activities of the Technical Committees of the Association when necessary. Includes the current Chairmen of the Technical Committees and such other members of the Association as are designated by the Board.

STATISTICS COMMITTEE

J. H. Keener, *Chairman*
Champion Paper & Fibre Co.
Canton, N.C.
W. C. MacAdam
Champion-International Co.
Lawrence, Mass.
H. L. Beach
Oxford Paper Co.
Rumford, Maine
W. R. Williams
Coosa River Newsprint Co.
Coosa Pines, Ala.
A. G. Natwick
East Texas Pulp & Paper Co.
Silsbee, Texas
Wm. Smidt
International Paper Co.
New York, N.Y.
C. G. Snyder
International Paper Co.
Camden, Ark.
C. W. Medford
Southland Paper Mills
Lufkin, Texas
G. H. Wesley
Owens-Illinois Glass Co. Mill Div.
Jacksonville, Fla.
A. L. Wenrich
Continental Can Co.
Hopewell, Va.
K. S. Trowbridge
North Carolina Pulp Co.
Plymouth, N.C.
G. W. Brumley
St. Marys Kraft Co.
St. Marys, Ga.
H. R. Palmquist
Marathon Corp.
Neenah, Wis.
C. V. Sahlin
Puget Sound Pulp & Timber Co.
Bellingham, Wash.
L. M. Cooper
St. Regis Paper Co.
Pensacola, Fla.

Recommends policies and advises on forms and procedures dealing with the collection, compilation, and distribution of statistics on receipts, consumption, and inventories of pulpwood.

Technical Committees

The five regional Technical Committees are made up of representatives of members operating within the region concerned. Lists of the personnel of these Committees are provided only to Association members. The current Chairmen are:

Lake States
LESTER POLLARD
Minnesota & Ontario Paper Co.
International Falls, Minn.

Southwestern
F. E. STABLER
Scott Paper Co.
Mobile, Ala.

Southeastern
T. G. HARRIS
Halifax Paper Co.
Roanoke Rapids, N.C.

Northeastern
J. T. MAINES
Great Northern Paper Co.
Bangor, Maine

Appalachian
H. L. SETZER
Champion Paper & Fibre Co.
Canton, N.C.

Program for 1957

In addition to its regular activities, this year's plans include:

(1) Action on any proposed amendments to the Fair Labor Standards Act which would affect pulpwood operations.

(2) Issuance of training guides and workers' notebooks on truck and tractor operation.

(3) Preparation and release of "Pulpwood Industry Facts—1957" in cooperation with American Forest Products Industries, Inc.

(4) Enlargement of the Association slide, print and movie library to bring it more up to date and useful to the membership.

(5) Issuance of a Directory of Research in the Growing and Harvesting of Pulpwood, as a result of the research fellowship established at the State University of New York.

(6) Expansion of the activities of the Forest Engineers to include conducting safety and training sessions during the eight-month period when the Safety and Training Officer is not available.

These plans and others hinge on the needs and wishes of the members of the Association and of the industry as a whole. The staff is well organized to carry out the jobs assigned to it by the membership through the Board of Directors. APA can be effective in serving the industry only to the extent that members first make known their wishes, and then participate in the formation of policies and in carrying them out actively.

PULPWOOD YARD SPEEDS HANDLING AND LOWERS OVERHEAD COSTS WITH LIFT TRUCK PULPWOOD LOADER

Trucks are unloaded in 4 minutes.

Load can be placed on near or far side.

ALAPAHA, GA. — S. E. Peck, pulpwood dealer, has greatly increased wood handling speed with a Hyster® 18,000-lb. capacity Pulpwood Loader, with lower costs all around, because of: (1) The greater reach of the Hyster Pulpwood Loader boom enables operator to load both the near and far sides of a rack car from one position. (2) Lower maintenance, as the machine is ruggedly constructed specifically for this duty. (3) Lower initial cost, as compared with other types of pulpwood loading equipment.

Pulpwood is handled by means of slings which are placed around the ends of the load. After picking up load from truck and placing it on a rack car, the front side of the boom (a specially-engineered heavy-duty "bumping" plate) is used to "bump" the log ends to a minimum uniform distance extending from side of car, as required by railroads.

According to S. E. Peck, the Hyster Pulpwood Loader has proven of "exceptional value" in lowering overhead costs and speeding handling of pulpwood.

Your Hyster Dealer will help you to increase the efficiency (and profits) of your pulpwood yard operation. . . . Call your Hyster Dealer today for full information.

"Bumping" is a quick, easy job.

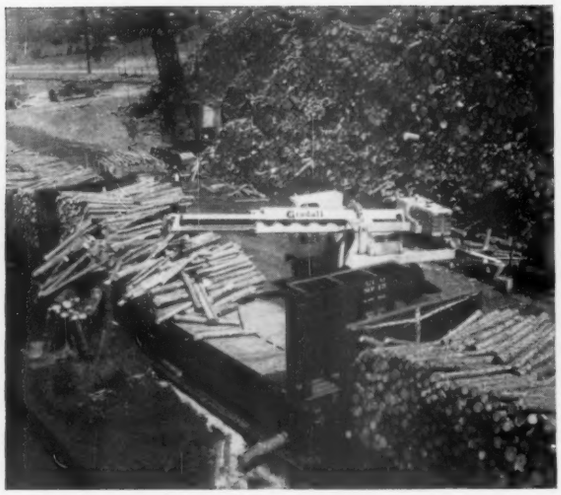
Call your Hyster Dealer today. He is listed in your telephone directory under "Trucks-Industrial"

HYSTER COMPANY

HYSTER

Hyster Industrial Trucks Increase Profits for Pulpwood Yards

Factories: PORTLAND, OREGON
DANVILLE, ILLINOIS
PEORIA, ILLINOIS
NIJMEGEN, THE NETHERLANDS



Gradall® unloads all rail-delivered wood for Westvaco's Covington Mill

This one Gradall unit easily and quickly unloads all pulpwood delivered by rail to the Covington, Virginia plant of West Virginia Pulp and Paper Company. Mounted on a self-propelled wagon, it features a blade for pushing logs from the delivering railroad cars into a flume alongside the track.

Gradall has more than ample capacity for handling the mill's monthly requirements of 36,000 cords. A similiar installation unloads 1,100 cords in an 8-hour shift.

In addition to securing more uniform production control, they have also eliminated an operator training problem—because Gradall's operation is so simple, positive and foolproof. No matter what your pulpwood handling problem requires —grapple or blade— Gradall is the cost-cutting answer. Why not arrange for a demonstration, today?

Gradall DIVISION OF WARNER & SWASEY Cleveland PRECISION MACHINERY SINCE 1880

® Reg. U. S. Pat. Off.

MAIL COUPON BELOW FOR FREE LITERATURE ON NEW GRADALL GRAPPLE

Gradall Division—Dept. PP-7
WARNER & SWASEY COMPANY
5701 Carnegie Avenue
Cleveland 3, Ohio

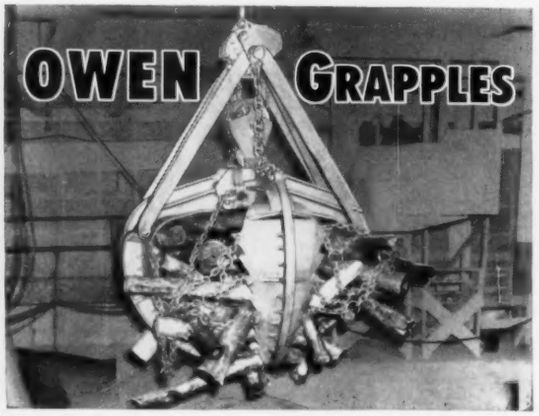
Please send me free literature on faster pulpwood handling by positive control grapple Gradall.

Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* ____ *State* _____



A SAFE INVESTMENT

In addition to the independent tine action (an exclusive OWEN patent) that gives OWEN Grapples greater grabs and larger log loads, you will find them more dependable and real time and money savers. A complete line of models and sizes, in both 4-prong and open side types.

Write today and get convincing facts and special illustrated pulpwood bulletin . . . *free upon request.*

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

SOUTHERN CORPORATION, CHARLESTON, S. C.

WILLIAMS-GRAY COMPANY
221 North LaSalle Street, Chicago 1, Illinois

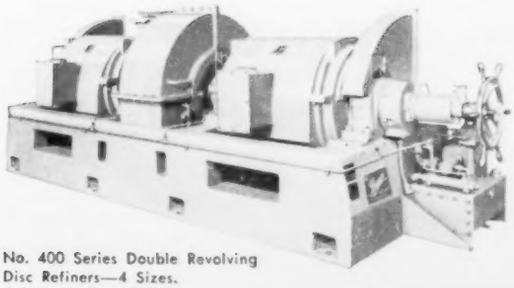
Paul Foster • Peter Talbot • Ross Lawrence

Herb Fishburn • Wes Gallup • Bill French

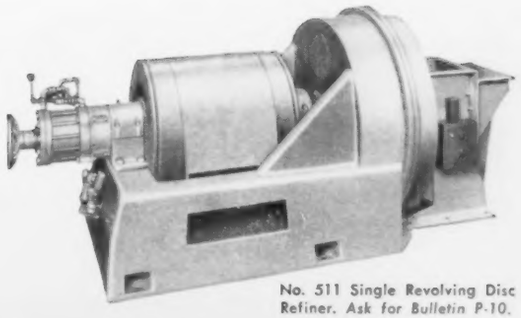
Lindsay & Niagara Wires, Knox Woolen Felts Cotton & Asbestos Dryer Felts, Carrier Rope Splicing Tissues, Deckle Webbing, Apron Cloth, Wire Brushes.

1957 PULPWOOD ANNUAL—ADVERTISERS INDEX

Allis-Chalmers Mfg. Co.	143	International Harvester Co.	103
American Hoist & Derrick Co.	99	Link-Belt Co.	back cover
Badger Machine Co.	133	Link-Belt Speeder Corp.	88
Bauer Bros. Co.	inside back cover	Mall Tool Co.	95
John W. Bolton & Sons Inc.	115	D. J. Murray Mfg. Co.	85
Carthage Machine Co.	92	Oliver Corp.	138
John Deere Industrial Div.	121	Owen Bucket Co.	146
Dominion Engineering Co. Ltd.	141	Pettibone-Mulliken Corp.	124
Dratt Manufacturing Corp.	103	Pioneer Saws	111
Fate-Root-Heath Co.	134	Remington Arms Co., Inc.	95
Filer & Stowell Co.	107	Soderhamn Machine Mfg. Co.	137
Ford Motor Co.	129	Thew Shovel Co.	127
Homelite Corp.	inside front cover	Warner & Swasey Co.	146
Hyster Co.	145	Williams-Gray Co.	146
Improved Machinery Inc.	117		

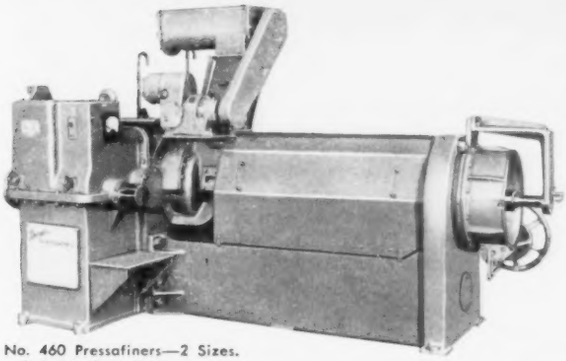


No. 400 Series Double Revolving Disc Refiners—4 Sizes. *Ask for Bulletin P-2.*



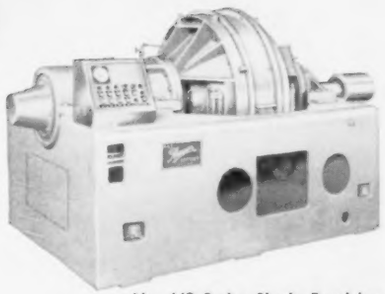
No. 511 Single Revolving Disc Refiner. *Ask for Bulletin P-10.*

Bauer EQUIPMENT FOR THE PULP AND PAPER INDUSTRY

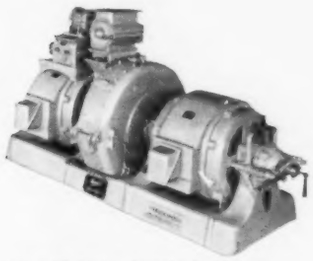


No. 460 Pressafiners—2 Sizes. *Ask for Bulletin P-12.*

Centri-Cleaners—7 Sizes. (For pulp and fiber slurries.) *Ask for Bulletin P-4.*



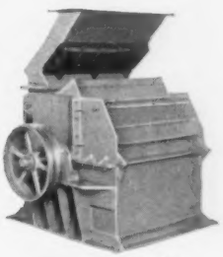
No. 440 Series Single Revolving Disc "Pump-Through" Refiners, 2 Sizes. *Ask for Bulletin P-13.*



No. 180 Series Double Revolving Disc Pulpers—2 Sizes. *Ask for Bulletin P-3.*

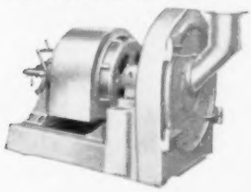
NOT SHOWN:
Rapid Cycle Digesters
Grenco Continuous Digesters
Model M & D Continuous Digesters
Permanent Magnetic Separators
Individual bulletins available.

Laboratory Mill. *Ask for Bulletin P-6.*



Nos. 435 and 438 Chip Breakers—2 Sizes. *Ask for Bulletin P-11.*

No. 240 Series Single Revolving Disc Mills—5 Sizes. (For dispersing, intensive blending, shredding.) *Ask for Bulletin A-7.*



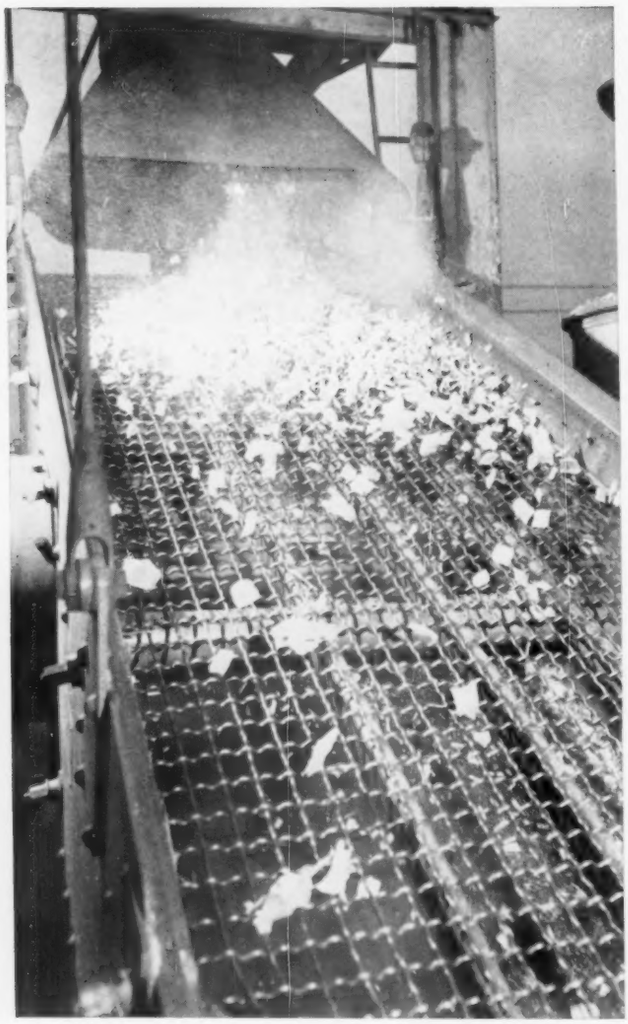
Bauer-McNett Fiber Classifier. *Ask for Bulletin.*

Bauer-Mead Lab. Refiner. *Ask for Bulletin P-5.*

Blowers and Exhausters. *Ask for Bulletin P-14.*

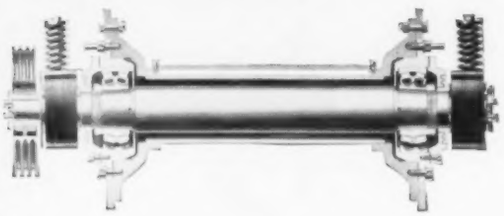
The Bauer Bros. Co., 1706 Sheridan Ave., Springfield, Ohio

Positive way to separate the profitable part of your chips



LINK-BELT "CA" double-deck vibrating screen separating oversize chips, slivers and sawdust from wood chips. Note the full loading and rapid clearing of the top deck. This screen can handle up to 2000 cu. ft. of chips per hour.

Powerful LINK-BELT "CA" vibrating screens accurately sort slivers, sawdust and oversize pieces



THE grease-lubricated, completely enclosed two-bearing vibrator, above, is the reason why Link-Belt "CA" screens provide fast, precise chip separation. Its smooth, Concentric Action imparts even, circular motion to every square inch of the screen decks . . . assures lively tumbling of every particle. And its unbalanced weights are easily adjusted to the amplitude of highest efficiency.

Besides rapid, sure stratification, Link-Belt "CA" screens offer the economy of overall rugged construction. Frictionless, labyrinth seals protect self-aligning roller bearing from dirt and abrasive dust. Stress-relieved decks are riveted to heavy side plates to form rigid box assemblies.

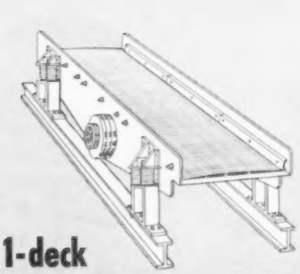
For full details on "CA" vibrating screens, call your Link-Belt office. Or write for Book 2554.

LINK-BELT

VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.524

A size and type to handle every load . . . as fast as your chippers can deliver it



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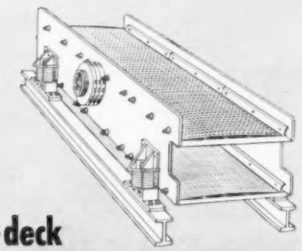

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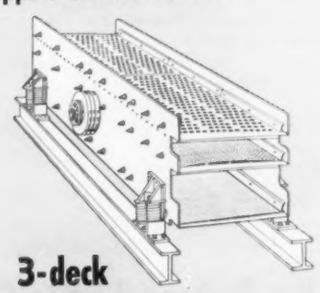

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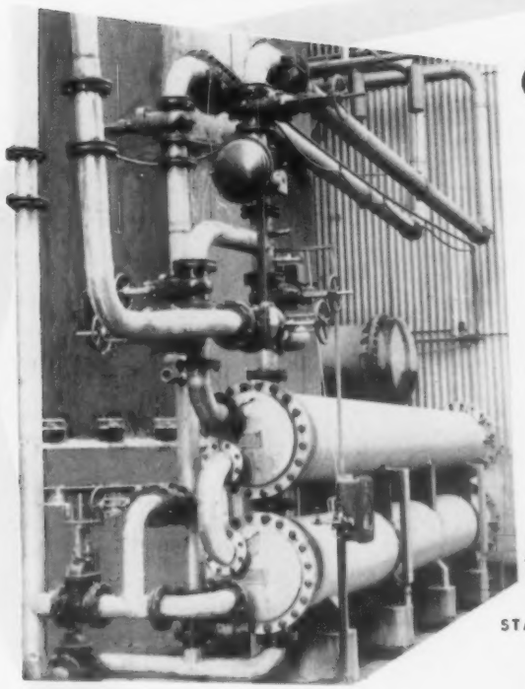


This Stainless Steel piping system includes "Alaskan" heat exchangers which cool settled acid on its way to the fortification tower.

Congratulations to:

WEYERHAEUSER TIMBER COMPANY
and
the HOFFMAN ENGINEERING CORP.
on Completion of the

COSMOPOLIS MILL

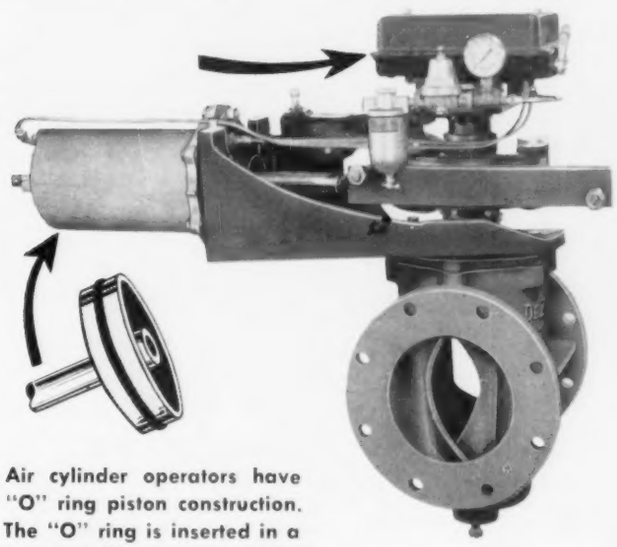
We illustrate "Alaskan" Type 317 welded pipe and fittings, pickled and passivated for maximum corrosion resistance, and "Alaskan" tubular Type 317 Stainless Steel heat exchangers.

STAINLESS STEEL PIPE & FITTINGS
. . . for the Pulp and Paper Industry

ALASKAN COPPER
SEATTLE Works WASHINGTON

3600 E. MARGINAL WAY • SEATTLE • EL. 5800 • TWX SE-392

Flow characteristics are quickly and easily altered by changing the cam in the positioner. Any desired flow pattern can be obtained with an appropriate cam design. The 4-way pilot is built-in, eliminating external tubing and gages.



Air cylinder operators have "O" ring piston construction. The "O" ring is inserted in a non-metallic material on the outer periphery of the piston, assuring maximum seal and longevity.

WHEN CONTROL IS ESSENTIAL...

DeZurik Automatic Control Valves deliver precise metering control on stock, white water and all other process lines.

The orifice of the valve maintains the same diamond shape at all times. Stock cannot hang up and pack, distorting the flow pattern and destroying precise control.

Their extreme sensitivity, their instant response, self-cleaning design and freedom from backlash add up to the most rigid, most accurate control possible.

For detailed information, write

DeZURIK CORPORATION
SARTELL, MINNESOTA

Strictly Personal

Northeast Notes

LESTER (Lefty) SMITH, who now serves in dual capacity of asst. mgr. of paper production for all St. Regis mills, under **JOHN McDERMOTT**, and also heads up Northern mills, was at the Chicago Supts. convention with his brother, **RED SMITH**, only man to be coach of both top pro baseball and football teams (N.Y. Giants in both cases) . . .

FRED W. MEARS, former executive of Great Northern Paper Co., has resigned as asst. administrator of the Business and Defense Services Administration, Washington, D.C., returning to his White Plains, N.Y., home . . .

GEORGE M. WAGNER has joined Downingtown Paper Co. as plant engineer. He is a Sharon, Pa. native, was two years at Drexel Institute (power plant operation); three years at Penn State Extension School (petroleum and natural gas engineering) and four years at Rutgers (business administration) . . .

GENE DONALDSON heads up sales promotion and advertising activities for Union Bag-Camp Paper Corp. He joined Union in 1938 . . . **RICHARD L. HOFF** steps up at Riegel Paper Corp. as assistant mgr. of pulp sales. He moves to New York from Riegel's Milford mill where he was quality control director . . . **JOHN B. SHIELDS**, recently with Continental Can Co., Shellmar Betner Div., has joined Riegel as product engineer, in packaging materials dept., New York . . .

DEAN P. STOUT is now general mgr. of sales for the Gair containerboard and kraft paper division, Continental Can Co. . . . **BOB** and **COLETTE HOWARD** (he's sales rep for Lindsay wires) recently moved into their new ranch-type six room house in Malvern, Pa. (Friends can write to 4 Carol Lane; bill collectors don't bother) . . . They have a son, Ricky, 8 years. Bob covers Pennsylvania, New Jersey, Delaware and some of South. . . . While in the land of Penjerdel, two newcomers have joined the Penjerdel Paper Peddlers troup (which performs for Supts'. meetings): **DAVE BROWN**, Penick & Ford, and **LEW WALKER**, U. S. Metal Coatings Co. . . .

PHIL NETHERCUT, TAPPI's new technical director, bought a home in Scarsdale, N.Y. . . . **WALT WELCH**, recently with Fallulah Paper Co., Fitchburg, Mass., has joined E. F. Houghton & Co., as technical service rep. out of Philadelphia . . .

DUDLEY NIXON, Geigy Dyestuffs, recently took off for a business trip to the West Coast . . . **STUART W. McLAUGHLIN**, comptroller, West Virginia Pulp and Paper Co., has been reelected treasurer of the Controllers Institute of America (held that post since 1951) . . .

DR. MARION B. GEIGER is now director, general development, Hooker Electrochemical Co., Niagara Falls, N. Y. . . . **ROBERT F. SCHULTZ** moves up to works mgr., **MAYNARD L. PARKER**, to production supt, and **BARRETT B. BROWN**, to asst. production supt. at Niagara . . . **NEVIN L. RUSH** is now manager, distributor sales, Philadelphia district, Raybestos-Manhattan, Inc. . . . **JULIAN P. CHILCOTE** is sales rep in New York district . . .

Promotions from East to West

(L to r): WALTER S. DEMPSEY joins H. Waterbury & Sons Co. as technical consultant. His 24 years in the industry include positions with Scott Paper Co., Rushmore Paper Mill, Doeskin Products (Mass. div.) and gen. mgr. of Mt. Tom Sulphite Mill and Wheelwright div., Doeskin Products.

DR. JOHN R. FANSELOW, asst. to mgr. of mills for Kimberly-Clark Corp., becomes assoc. professor in the dept. of Paper Technology at Western Michigan U., Kalamazoo, Mich., next Sept. Dr. Fanselow is a graduate of Ellsworth College, has m.s. degree from the U. of Chicago and ph.d. from the U. of Wisconsin.

CHARLES S. ADAMS joins the sales staff of Sandy Hill Iron and Brass Works, Hudson Falls, N.Y., after 17 years as sales engineer with Rice Barton of Worcester, Mass. He is a mechanical engineering graduate of Worcester Tech.

W. E. PARKINSON, gen. supt. of woodmill, finishing and services at Crown Zellerbach Corp.'s Camas plant, becomes res. mgr. of the firm's Carthage, N.Y., mill Aug. 1, replacing E. H. Nunn who will manage new CZ-Time mill at St. Francisville, La.

New Positions in East

HUGH W. SLOAN is elected v.p., St. Regis Paper Co. He will continue as v.p. and managing director of the firm's Canadian subsidiary, St. Regis Paper Co. (Canada) Ltd., and participate in overall sales of the parent company.

FREDERIC E. BAHRENBURG, plant mgr., Hammermill Paper Co., Erie, Pa., is elected a director, succeeding William T. Brust, who retires. Mr. Bahrenburg is a grad of N. Y. State College of Forestry at Syracuse U. and joined Hammermill in 1948.

NORMAN T. BEARDSLEY, as director of customer relations for Chippewa Paper Products Co., will be on call from coast to coast. He served with Gummed Products Co., Crossett, Union Bag and Brown Co. . . .

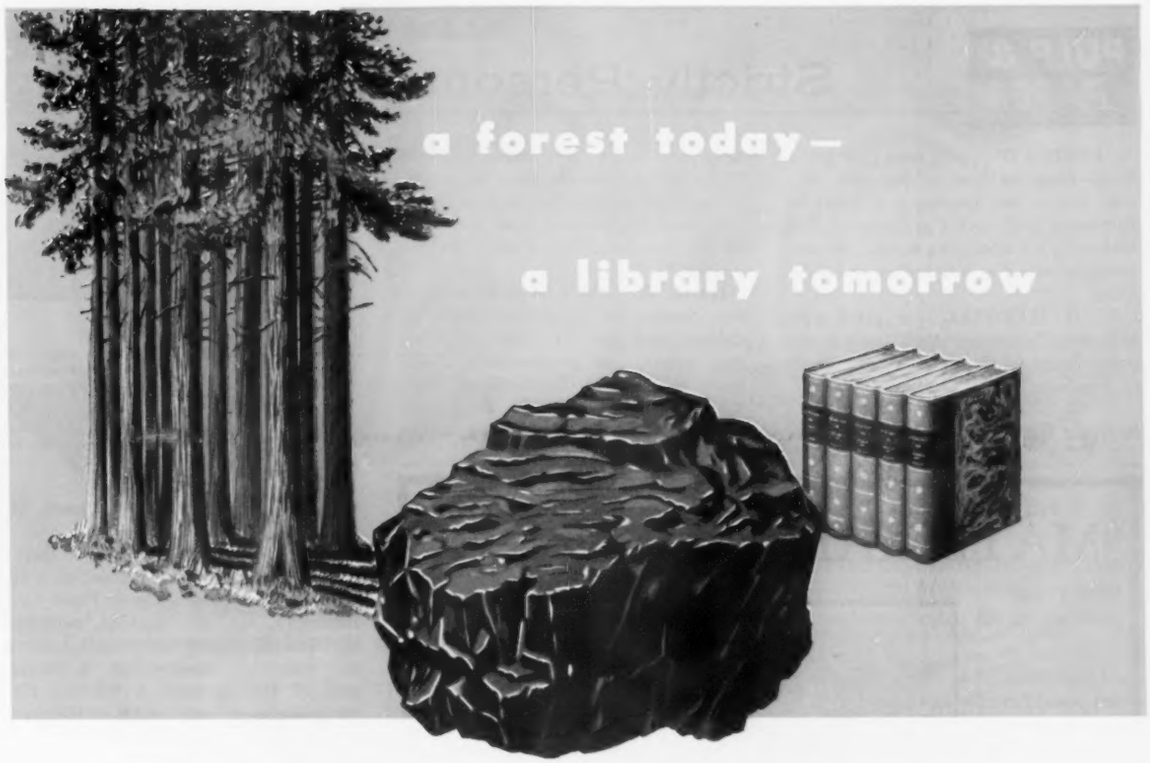
Frank Juckett Passes

Frank A. Juckett, 74, for 21 years president of The Sandy Hill Iron and Brass Works since 1936, died of a cerebral hemorrhage May 14 while en route home from Washington, D.C.

He was born in York, Neb., raised in Dresden, N. Y., he had been president of a fine paper mill in the Berkshires; president and founder of the Old Colony Envelope Co., Westfield, Mass.; and sales and advertising executive of Strathmore Paper Co., West Springfield, Mass., before joining Sandy Hill as president in 1936. The company was at a depression low level but he surrounded himself with top-quality executives and by 1941 had rebuilt the company to its former prosperous position.

Southern Sidelights

JACK W. WARNER, pres., Gulf States Paper Corp., announces appointment of **HOMER HUMBLE** as director of employee relations. Mr. Humble's first job in the paper industry was with International Paper Co.'s converting mill in 1930. He was sixth v.p. of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers when he resigned in Dec., 1956 to accept position with Robert Gair div. of Continental Can Co.



...with the aid of B&O Bituminous

Before a felled tree can become a medium for news, or knowledge, or entertainment, many tools of the paper maker's craft must be employed. *Fuel* is one—and choosing the proper kind is important, from the standpoints of both cost and efficiency.

In Baltimore & Ohio territory—easily accessible to mills—are extensive Bituminous deposits. In structure and volatility this coal meets perfectly the requirements of the paper industry. Up-to-date mechanization at the mines keeps production costs low—the ease of storing at the mill removes the need for costly facilities.

Call on us for advice as to the proper coal for *your* requirements. We'll show you where to find it and how to burn it. You will be impressed by the new efficiency, economy, and cleanliness of Bituminous. *Ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE

BALTIMORE & OHIO RAILROAD

LINKING 13 GREAT STATES WITH THE NATION

Constantly *doing things* **—better!**

PULP & PAPER — Strictly Personal

. . . **LESTER DUNCAN** joins Gulf States Paper Corp. as head of materials controls design. Mr. Duncan is a native of Baltimore, Md., and a graduate of Yale University's Engineering School. He was formerly with General Aniline and Film Corp. . . .

W. H. MAXWELL, bag plant supt. at Crown Z's Camas, Wash., mill, is appointed supt. of the new bag plant built at Bogalusa, La., by Gaylord div. of CZ. . . . **G. E. SCOFIELD**, resident mgr., Rayonier Inc.'s Fernandina Beach, Fla., mill, announces promotion of **JOE VELARDI** to bleach plant supt. Mr. Velardi has degrees in both chemistry and chem. engineering from the U. of Illinois, has been with Fernandina div. since Feb., 1953. . . .

HANK D. JONES, representative in the South for Raybestos-Manhattan, Cabble wires and Ferguson Non-Plugging valves, has purchased a farm—Route 6, Box 302, Brush Creek Road, Asheville, N.C. He and his family will spend summers there, returning in October to his home at Bennett Beach, St. Petersburg, Fla. . . .

New I.P. Posts in South
J. FRANK MIXSON (left), mgr. at Springhill, La., mill for International Paper Co., succeeds Howard Hinman, new mgr. at Pine Bluff, Ark., as mgr. for I.P. at Georgetown, S.C. F. S. McMILLAN (right) moves up from asst. mgr. to mgr. at Springhill.

JAMES L. MADDEN, v.p. and director of Scott Paper Co., was elected a director of Brunswick Pulp & Paper Co., Brunswick, Ga. Mr. Madden, currently in charge of all Scott timberlands, logging and pulpwood procurement, is former pres. of Hollingsworth & Whitney Co. He is also pres. and director of Hollingsworth & Whitney Ltd., Scott's Canadian subsidiary, and a director of British Columbia Forest Products Ltd., Vancouver, B. C. . . . **RALPH R. ROSE** is new mgr., basic refractories project, refractories div., H. K. Porter Co., Inc. He will coordinate Porter's basic refractories plant being built at Pascagoula, Miss. Mr. Rose is a graduate of Ohio State U., with ceramic engineering degree. . . .

The way **JACK GUTHRIE** became Southern representative for Chemical Linings Inc. hinged on the location he picked for his previous home on Atlantic Beach, Fla. It was in a duplex, the other resident being Pres. **MURRAY BENNETT** of Chemical Linings (326 9th St.). Jack had been an engineer in St. Regis woodlands division. Now Jack resides at 4157 Ashford Road, Atlanta (phone Cedar 30735). . . . **W. L. RIVES** is accompanied by his wife when he goes to work at his fine new stainless steel and alloy fabricating plant out at 5400 Rio Grande Ave., Jacksonville. Yes, they both work at the plant, where she would rather be any day than at home. . . .

W. J. GARRITY takes over the new position of mgr. of Carolina paper sales for Riegel Paper Corp., in anticipation of the new paper machine to be in production at Acme, N.C., by early 1958. . . . **E. PUTNAM HEAD** is now Southeastern regional mgr. supervising Atlanta, Birmingham, Charlotte and Jacksonville officers of Mason-Neilan division of Worthington Corp. . . . Steel and Engineering Products Co., El Paso, Tex., has been named sales rep. for western Texas and New Mexico by J. F. Pritchard Co. . . .

MATERIALS HANDLING

Constant improvement and refinement in the art of paper manufacturing keeps the industry on a highly competitive basis. Important in the final accounting—if not in the final product—is plant efficiency. An important item in any budget is the handling of chips and other bulk materials, important both in cost of operation and in its efficiency.

Rader's staff of experienced engineers brings you increased efficiency with increased savings, using high pressure pneumatic conveying systems that keep materials moving at peak speeds. Write or phone for information.

RADER PNEUMATICS, INC.

1739 N.E. 42nd Avenue Portland, Oregon

Vancouver, B. C. 4645 Main St. | Eureka, Calif. Box 61 | Boston, Mass. No. 10 High St. | Memphis, Tenn. Box 3722 Municipal Airport

AT MANY WELL KNOWN MILLS

Venturi Evaporator-Scrubbers

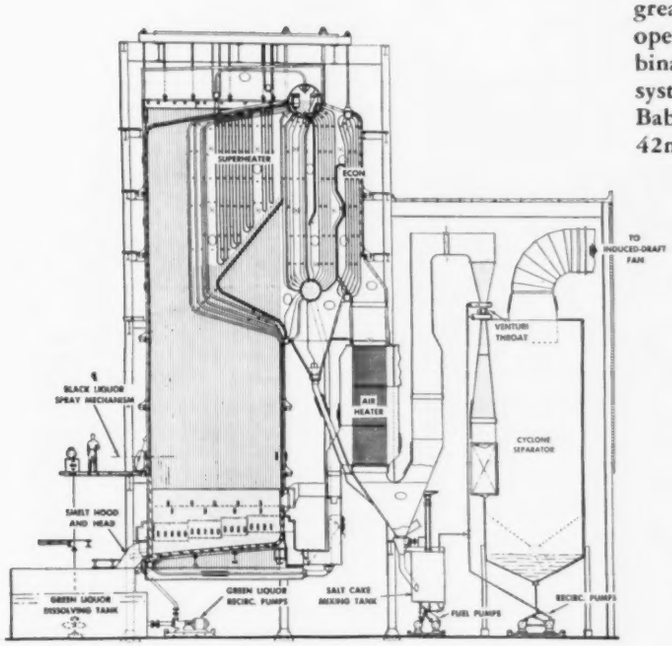
IN B&W RECOVERY SYSTEMS

assure greater operating efficiency

A notable advance in black-liquor recovery is illustrated by the B&W System shown, which features the Venturi Evaporator-Scrubber, and is typical of installations in operation at the Thilmany, D. M. Bare, Western Kraft, Potlatch Forests, Southern Kraft and other pulp and paper plants.

The B&W Venturi Evaporator-Scrubber combines in one unit the concentration of black-liquor with the collection of salt cake fume. Its complete dependability and unusually high efficiency have been thoroughly tested in service for more than three years.

Companies have chosen B&W Recovery Units, equipped with Venturi Evaporator-Scrubbers, for greater efficiency in their black-liquor recovery operations. Whether your mill requires this combination or another, B&W can provide the recovery system that *best* meets your requirements. The Babcock & Wilcox Co., Boiler Division, 161 East 42nd Street, New York 17, N. Y.



VENTURI EVAPORATOR - SCRUBBER LICENSED FROM PEASE, ANTHONY EQUIPMENT CO.

VENTURI-EQUIPPED B&W Recovery Units (in operation and on order)

Thilmany Pulp & Paper	Northwest Paper
D. M. Bare Paper	Mead Corp. (Lynchburg)
Western Kraft	Gulf States Paper
Potlatch Forests	National Container
Watervliet Paper	Buckeye Cellulose

Southern Kraft Division
International Paper Co.—4 Plants

ADVANTAGES of the B&W Venturi Evaporator-Scrubber

- Simple to operate
- Low in First Cost
- Increases Overall Thermal Efficiency
- Reduces Maintenance Requirements
- Continuous, High, Fume Collection Efficiency
- Minimum Space Requirement
- Reduces Multiple-Effect Evaporator Load

BABCOCK & WILCOX

BOILER DIVISION

P-795

PULP & PAPER

Strictly Personal

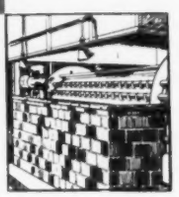
Promotions at Rayonier mills in Fernandina and Jesup—**L. E. (Larry) SELLERS** has assumed the duties of asst. chief chemist at Fernandina. He's a U. of Fla. grad. . . . **JOHN TRACY** leaves Fernandina for Jesup, where he will be shift supt. John holds two degrees from U. of Washington. . . . **E. P. (BUD) WILSON,** moves into the shift supt. position vacated by Mr. Tracy at Fernandina. He graduated from U. of Montana. . . .

Safety notes: Mgr. **E. E. ELLIS** is proud of his mill's perfect safety record for the first quarter of 1957. Natchez captured first place in the Southern Kraft Division. . . . And safety consciousness is paying off at The Crossett Co., where workers achieved a 25 per cent reduction in accidents last year to make 1956 the safest work year yet. . . . At Bowaters Southern, Calhoun, Tenn., power and steam, stores and instrument shop, rang up 1,000 days without an accident of any kind. . . .

TENNESSEE CORPORATION

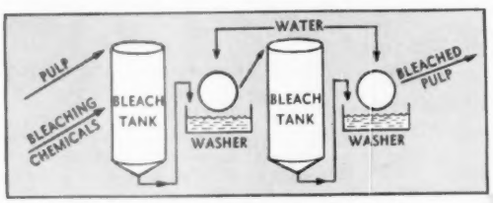
LIQUID SULFUR DIOXIDE HIGHEST QUALITY SO_2

for Effective Removal of



Residual Chlorine!

Tennessee's liquid Sulfur Dioxide is a most efficient and economical antichlor. Removes residual chlorine and other materials which cause color reversion or yellowing with age. It also eliminates excessive residual chlorine in water.



Tennessee's Liquid Sulfur Dioxide practically 100% pure, is also very effective as a reducing, bleaching, and neutralizing agent, preservative and pH control.

Available In:
- CYLINDERS
- TON DRUMS
- TANK TRUCKS
- TANK CARS

We would like to consult with you on the possibilities of Tennessee's Liquid Sulfur Dioxide in your processing.

TENNESSEE CORPORATION

617-629 Grant Building, Atlanta, Ga.

Kingsport Engineers Promoted

PAUL C. BOBO (left) is new div. engineer, The Mead Corp.'s Kingsport, Tenn., division, announces Div. Mgr. E. H. NIEDERAUER. Mr. Bobo replaces LOUIS L. MRACHEK, who won a Sloan Fellowship for a year at Massachusetts Inst. of Technology. GORDON H. KETTERING (right) takes the new position of asst. div. engineer. JAMES F. SMITH succeeds Mr. Bobo as supt. of power and electric maintenance and E. L. JENNINGS becomes foreman of miscellaneous operations.

Midwest Medley

When **LOUIS MEYER,** former paper mill supt. from Port Edwards, Wis., mill of Nekoosa-Edwards, retired back in 1949, he figured on "plenty of relaxing". It didn't work out that way. Paper mills in many parts of the country wanted his services for startups of new machines or other consulting jobs. He says he has averaged 40,000 miles a year driving to mills. Furthermore he is busy making hooked rugs. And every fall, he and his wife gather hickory nuts, donating proceeds to their church . . .

C. C. JOHNSON is new sales mgr. for Rhinelander Paper Co., Rhinelander, Wis., directing operational sales and all district and field sales personnel. Mr. Johnson is a son of the late Spud Johnson, widely known for many years as chief engineer at Rhinelander. . . . **SYDNEY FERGUSON,** who retired a board chairman, The Mead Corp, after nine years in that position, continues as a member of the board, the finance, policy and executive committees. A native of England, Mr. Ferguson joined Mead in 1919, has been pres. of American Forest Products Industries and pres. of American Paper & Pulp Assn. . . .

HELEN and **WALLY KORTH** are proud parents of a baby girl, Sandra Lee, born on April 30—their first child. She's a readhead and weighed in at 8½ lbs. Mr. Korth is in sales development, International Harvester Co. and their home address is Box 270, Melrose Park, Ill. . . . **RAYMOND L. JANES,** junior student in paper technology at Western Michigan U., conducted a group of fellow students on a week's tour through Wisconsin, where they visited a variety of papermaking operations. Their schedule included visits to the Institute of Paper Chemistry, Marathon Corp.'s Green Bay plant, Joseph A. Plank and Co., Gilbert

Paper Co., Appleton Coated Paper Co., Consolidated Water Power and Paper Co.'s Wisconsin Rapids mill, Nekoosa-Edwards Paper Co., the Forest Products Laboratory of the U.S. Forest Service, and Beloit Iron Works. . . .

JOHN R. DAM, Allied Paper Mills, Kalamazoo, Mich. is new chairman of the Michigan div., Superintendents Assn. for the 1958-58 season. Other officers elected are **HENRY A. BONGERS,** Sutherland Paper Co., Kalamazoo, Mich., 1st vice chairman; **CHARLES RUSSELL,** S. D. Warren Co., Muskegon, Mich., 2nd vice chairman; and **E. M. BAKER,** National Gypsum Co., Kalamazoo, Mich., secy.-treas. Tribute was paid to **VINCENT D. REDMOND,** Kalamazoo Paper Co., Kalamazoo, Mich., who served the past two years as secy.-treas. . . .

Thilmany Pulp & Paper Co., Kaukauna, Wis., recently played host to 30 representatives of 19 paper distributing firms. The group was welcomed by **E. H. JENNINGS,** Thilmany president, Sales Vice Pres. **G. E. McCORISON,** Gen. Sales Mgr. **V. G. HAAG,** and other mill sales personnel. **C. L. DOSTAL,** asst. to the exec. v. p., discussed Thilmany's expansion for product improvements . . . **H. G. WINTGENS,** exec. v. p., Charmin Paper Products Co., and **WALTER ADRIAN,** exec. v.p., Badger Paper Mills, Inc. were named new board directors. . . .

CHARLES L. WOOD, pres. and board chairman of River Raisin Paper Co., Monroe, Mich., announces election of **A. W. SCHULTE** as v. p. for sales and secy. . . . **RICHARD D. AYERS** joins the Chicago sales office of Chicago Bridge & Iron Co. He started with CB&I in 1954 as field engineer in the foreign erection dept. Born in Cumberland, Md., Mr. Ayers got his b.s. from Massachusetts Institute of Tecnnology in 1952 . . .

Cornell Paperboard Products Co. announces election of new officers: Pres. **ARTHUR W. MILLER;** Senior Vice Presidents **WESLEY W. RACE** (Paperboard) and **RANDALL A. ROSS** (Con-

New Directors at Chase Bag

WILLIAM N. BROCK (left) and FRANCIS H. LUDINGTON, JR., (right) are new members of board of directors, Chase Bag Co., Chicago, Ill. Mr. Brock, v.p. and gen. sales mgr., has been with Chase since 1934. Mr. Ludington, v.p. for mfg., is the fourth generation of his family to serve as officer of Chase, and the third generation on the present board.

Panalarm Annunciator pinpoints process "off-normals"

In the process industries and among users of automatic machinery, trouble is minimized when it's caught early. That's the purpose of the Panalarm Annunciator System—a continuous monitor of your process.

One typical adaptation of the modular Panalarm system is engineered to differentiate between the first "off-normal" and subsequent "off-normals" caused by the first. This feature allows instantaneous recognition of the prime source of trouble in a "chain reaction."

Another adaptation is designed specifically for motor start-up and shut-down. It has also been successfully adapted for supervisory control, pump control and programming.

Your Panalarm sales engineer will be happy to make a survey of your requirements to determine whether a Panalarm system can aid productivity and safety in your process. For electrical and mechanical data on standard systems, request Catalog 100B on your letterhead.

PANALARM

Division of
PANELLIT, INC.
7425 N. Hamlin Avenue, Skokie, Illinois
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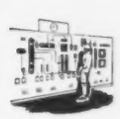
Engineered Information Systems for Industry


Graphic Panels, Control Centers

Panalog Information Systems

Panellit Service Corporation

Could this have been pumped by anything but a LIQUID IMPELLER?

It was dented, and somewhat the worse for wear, but nevertheless still recognizable as an auto muffler. The question: how did it get into the re-pulp stock line from the hydropulper?

The answer is simple. The muffler, twelve inches long, was *pumped* out of the hydropulper through an *eight*-inch Wemco torque-flow Solids Pump.

This is an actual case history, typical of many about this amazing pump and its "can't clog" *liquid impeller* action. Interested? Just ask for the facts.

WEMCO

TORQUE-FLOW SOLIDS PUMP

WESTERN MACHINERY COMPANY

650 FIFTH STREET, SAN FRANCISCO 7, CALIF.

PULP & PAPER

Strictly Personal

verted Products); Vice Pres., Secy. and Treas. **FRANK G. OSBORNE**; Vice Presidents **C. EDWARD LINDGREN** (Folding Carton Operations), **THEODORE L. SEITH** (Container Operations) and **GEORGE L. PETERSEN** (Cornell Mill Operations); Asst. Secy. and Asst. Treas. **GEORGE J. CHRISTIANSEN**. . . .

ROBERT MORTENSON joins the engineering dept. of Nekoosa-Edwards Paper Co., Inc., Port Edwards, Wis. Mr. Mortenson, a 1936 U. of Wisconsin grad, was project engineer at Consolidated Water Power & Paper Co. for 15 years, later held engineering positions with Wausau Paper Mills, Improved Machinery Co. and John Strange Paper Co. . . . **TOM DUPREE** is new supervisor of the payroll dept. at Nekoosa. He's been in that dept. for two years, before that work in Port Edwards machine room. . . . **RUSS CRETE**, training director, is new secy. of Nekoosa's advisory house committee, supervising company and Nekoosa-Edwards Foundation properties. **BOB JOHNSON** continues as chairman. Other members are **J. E. ALEXANDER, S. A. CASEY, N. E. NASH, C. H. REESE, C. C. PARVIN** and **C. W. GUELCHER**. . . .

Long Service Recognized

C. C. "CUB" FRANCES (r), machine tender, No. 15 Machine at CZ Camas, receives congratulations and 45-year service pin from Asst. Vice Pres. G. H. GALLAWAY (l).

Pacific Patter

J. V. SAVAGE, sulfite mill supt., Crown Zellerbach Corp., Camas, Wash., was named Papermaker of the Month by *The Agitator*, Noble & Wood Machine Co. publication. Mr. Savage took a job with Oregon Pulp and Paper Co. in Salem, Ore., in 1926, after becoming discouraged trying to sell life insurance. After working for Stebbins Engineering & Mfg. Co., he became a shift worker at

Chemical Pulping Processes

Chemipulp's high degree of chemical, mechanical and physical control over materials and operations results in maximum plant output, high pulp quality, and low operating costs.

- *Circulating Systems*
- *Chip Distributor*
- *Chip Pretreatment*
- *Waste-Liquor SO_2 Gas and Heat Recovery*
- *Stripping Towers*
- *Tail Gas Towers*
- *Hydroheater*
- *Spray-Type SO_2 Gas Cooling System*
- *Acid System (Bubble Absorption)*

Chemipulp Process Inc.

Watertown, N. Y.

Associated with

Chemipulp Process Ltd., 253 Ontario St., Kingston, Ont.

•

Pacific Coast Representative

A. H. Lundberg, Orpheum Bldg., Seattle 1, Wash.

Grays Harbor Pulp & Paper Co. mill (now Rayonier Inc.) at Hoquiam, Wash. He's been sulfite mill supt. at CZ since 1939. . . .

EARL F. ANDERTON is new asst. to gen. mgr. at Scott Paper Co.'s Everett, Wash., plant. Mr. Anderton joined Scott in 1932, has been plant mgr. at the company's Empire, Ore., plant since 1952. **ROBERT E. MARCH**, currently asst. plant mgr. for services at Chester, Pa., succeeds Mr. Anderton as plant mgr. at Empire. He's been with Scott since 1946. . . .

HARRY BUKOWSKY, former plant engineer at CZ's Port Townsend, Wash., kraft mill for many years, now retired and a consulting engineer in Portland, Ore., recently returned there with Mrs. Bukowsky from an 8,000 mile tour of southwestern United States. . . .

R. P. WOLLENBERG succeeds to post of vice pres., operations, Longview Fibre Co.

Pres. **H. L. WOLLENBERG** of Longview Fibre Co. announces **R. P. WOLLENBERG**, formerly vice president and manager of the container operations, has been appointed vice president-operations and assumes the duties of the late **R. S. WERTHEIMER. W. W. CLARKE**, assistant mill mgr., and **P. M. WERTHEIMER**, assistant mechanical supt., were elected directors of the company. . . .

W. H. GRAHAM transfers from Natchez, Miss., June 1 to become manager of Johns-Manville's new insulation board plant under construction at Klamath Falls, Ore. . . . **GORDON J. MANARY**, formerly of Pacific Lumber Co., is vice president-general manager of Simpson Redwood Co., Arcata, Calif. subsidiary of Simpson Timber Co. . . . **ROBERT J. SEIDL**, of the Madison forest products laboratory, has been named director of Simpson Timber Co.'s new central research laboratory in Seattle. . . .

R. G. ARMSTRONG, office manager of Longview Fibre Co. since 1936, has been named Northwest sales representative and continues as assistant secretary, the change made to provide additional sales effort to market output of Longfibre's new No. 7 machine. **W. O. BEATON**, former assistant bag factory supt., Camas, succeeds W. H. Maxwell, (who moves to Bogalusa, La., division) as supt. at Camas. . . . **B. O. REESE** became yard supt. at Crown's Camas mill replacing **W. F. PALMER** who retired after 41½ years service. . . .

New RIDGID 4PJ
Geared Threader
* is now
JAM-PROOF

"...It's Safe, Boss...
I Don't Need To Watch It
...It Won't Jam"
Patents Applied for
RIDGID 400A Power Drive with Universal Drive Shaft operates 4PJ Threader on 2½" to 4" pipe held in Tristand Chain Vise, all RIDGID products.

*Automatically Stops Threading After Standard Length Thread Is Cut

Power drive threading is safe and easy with this new 4PJ—no more watching of either die stock or drive! 4PJ can't jam—drive pinion kicks out automatically after full thread is cut. Extra-easy to handle . . . mistake-proof workholder, no bushings . . . fully enclosed gears . . . RIDGID most-for-your-money—Buy new 4PJ at your Supply House!

The Ridge Tool Company, Elyria, Ohio, U.S.A.

RIDGID
Work-Saver Pipe Tools

Strictly Personal

WILLIAM D. (BILLY) WELSH, former public relations director for Crown Zellerbach Corp., and "all-time champion" toastmaster for pulp and paper industry functions on the Pacific Coast for many years, missed the opening of trout season at Lake Crescent, Wash., his present home. He underwent major surgery in a Berkeley, Calif., hospital. He is making a good recovery. . . .

HAROLD ROGGE, Pacific Northwest representative for Earl Paint Corp., Utica, N.Y., manufacturers of Erkote Technical Mastics, has moved from his Seattle offices and is now at Edmonds, Wash., P.O. Box 336, Telephone, Myrtle 3-447. He also opened a branch office at 661 Richards St., Vancouver, B.C., with **RAY CAMPBELL** as the local representative. . . .

JACK BEAVER, project manager for Hoffman Construction Co. on Weyerhaeuser's Longview and Cosmopolis pulp plants, spent June in Europe visiting Denmark, Sweden, Germany, Austria, Turkey, Greece, Italy, Switzerland, Spain, France, England and Scotland, returning home in July. . . .

CIBA

NEOVADINE®

AL

for cleaning paper machine felts

leaves felts clean soft open resilient

Powerful "dispersing action" cuts down on wash-ups . . . actually lengthens life of felts . . . NEOVADINE AL is another "Paper-Proved" product of CIBA that brings new speed and overall efficiency to both board and fine paper production unmatched by any other product offered for the purpose. For full details, sample, address . . .

CIBA COMPANY INC.
Paper Chemicals Department
627 Greenwich Street, New York 14, N.Y.

New Technicians at Fibreboard

THOMAS F. MARTIN (left) is now technical supt. at Fibreboard Paper Products' Vernon, Calif. plant. He comes from Fibreboard's Stockton, Calif., plant where he was technical supt. With Fibreboard nearly two years, he was former tech. assistant to the supt. Hartford City Paper Co., Hartford City, Ind. He is a native of Queens, N.Y., holds a BS in pulp and paper manufacture from New York State College of Forestry, Syracuse University. New quality control supervisor is WILLIAM A. STREAKER (center), who served as civil engineer with the Los Angeles Flood Control District, and chemical engineer with General Chemical Co. He is an alumnus of Illinois.
A. F. LANDSBERG (right) is new process control engineer, with service in Sweden's Ljusne Woxna AB and Malmo Hogre Tekniske Laroverk. He came to Fibreboard from Minnesota & Ontario Paper Co.

The Dan Charles Agency, for many years in downtown Seattle, is now at home in a recently purchased building at 5600 14th Ave., N. W., in Seattle. New phone, HEmlock 6556. Personnel remains unchanged: **MRS. DAN CHARLES** and **NORMAN J. McCURDY** will be in Seattle, while **VICTOR S. RISLEY, JR.,** will work out of Portland, Ore. The Agency represents D. J. Murray, Mt. Hope, Wisconsin Wire, Knox Woolen and Wm. E. Hooper dryer felts and rolls. . . .

Congratulations to **JIM DURGAN,** St. Regis' new public relations representative at Tacoma, on publication of Vol. I No. 1 of "St. Regis *Pacific Kraftsman,*" house organ for west coast plants . . . item in the "Kraftsman" shows Tacoma Resident Mgr. **JACK LAMB** and Mrs. Lamb on anniversary trip to Hawaii. It was a double celebration—29 years with St. Regis and 30 with Mrs. Lamb. He started as storekeeper at the Tacoma kraft mill in 1928. . . .

Several St. Regis employes at Tacoma, Wash., kraft mill, journeyed to Hinton, Alberta, recently to help when the new mill there started up, including **AL CADIGAN,** retired chief chemist. Making the trip for "good"—i.e., they're now regular residents at Hinton—are ex-Tacomans **A. C. "Ace" McCORRY,** new general supt. at Hinton; **JOHN McCORRY,** now assistant p. a.; and **BEN HOY,** technical director. . . .

A. H. Lundberg Inc., consulting engineers have opened a handsome new contemporary-styled office building on Mer-

cer Island, across the Lake Washington Floating Bridge from Seattle. The new address is 7835 S. E. 30th St. **HALVAR LUNDBERG** and his son **LENNART** and staff formerly occupied offices in downtown Seattle. . . .

Column from Canada

E. L. McCAMMON is new control supervisor and **GORDON GRAHAM** woodroom supt., according to **E. E. CRANDALL**, resident mgr., The Ontario-Minnesota Pulp and Paper Co., Ltd., Kenora, Ont. Mr. McCammon has a b.s. in chemistry and physics from the U. of Manitoba and has been with Mando since 1954. Mr. Graham, with Mando since 1926, replaces **DONALD SHAW** who died recently. . . .

HENRY S. WINGATE, pres., The International Nickel Co. of Canada, Ltd., was awarded the honorary degree of Doctor of Laws by Chancellor **VICTOR SIFTON** of the University of Manitoba. Mr. Wingate is a graduate of Carleton College, Minn., and has Juris Doctor degree from U. of Michigan Law School. . . .

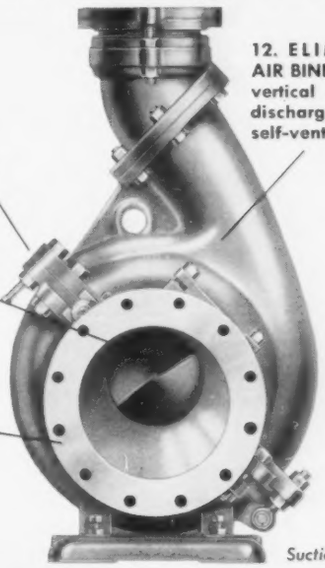
HOWARD M. URQUHART, former assistant resident manager of Powell River Co. at Powell River, B.C., has been transferred to Vancouver head office to gain further experience in fields of policy and activity outside mill operations. A chemical engineering graduate of the University of Saskatchewan, he starred as a baseball pitcher in his youth.

ROBERT H. SCANLON, Powell River Co. director and for many years an executive at the British Columbia paper town, recently became the first San Franciscan to receive the prized Boys' Club of America medalion. . . . **DR. RALPH PATTERSON** has been director of planning and research for Powell River for some time, but recently he was joined by **DAVE HARPER** as assistant director, with **TOM NEWMARCH** as planning assistant.

To Manage Alaska's Next Mill

TOM STEIN, who has been resident manager of Jesup, Ga., mill for Rayonier since before its startup has accepted appointment as resident manager of new mill being built at Sitka, Alaska, by Japanese-American owners, as announced at their Seattle offices. He is graduate of Bucknell Univ. and was with Minnesota & Ontario Paper Co. in engineering and operations before going to Jesup.

Correct stock pump problems 12 ways with the Fig. 3135



Suction end view.

1. FASTER MAINTENANCE. Just one man can open the diagonally split, hinged casing and remove the rotating element without disturbing piping.

2. MORE UNIFORM STOCK. Screw inlet impeller shears and draws stock into impeller with minimum shock and dehydration.

3. DIRECT CONNECTION TO STOCK CHEST. You can choose from various sizes of this large suction opening.

4. GET STOCK TO THE IMPELLER FREELY. Fig. 3135 has an extra big impeller eye—8″ on the 6″ pump, for example.

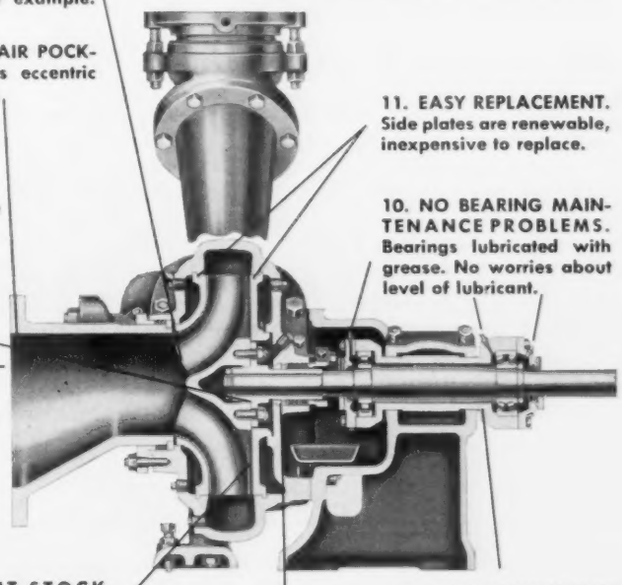
5. PREVENT AIR POCKETS with this eccentric suction piece.

6. IMPELLER SECURELY FASTENED. Keyed sleeve and flange assembly holds impeller secure under ALL conditions.

12. ELIMINATE AIR BINDING. Top vertical centerline discharge casing is self-venting.

11. EASY REPLACEMENT. Side plates are renewable, inexpensive to replace.

10. NO BEARING MAINTENANCE PROBLEMS. Bearings lubricated with grease. No worries about level of lubricant.



Cross section—shown with standard construction: roller bearings, grease-lubricated.

7. PREVENT STOCK JAMMING BEHIND IMPELLER. Full open impeller has back wall ejector vanes to prevent stock accumulation behind impeller. Also helps maintain axial thrust balance.

8. KEEP STOCK OUT OF STUFFING BOX. Throat bushing and water seal ring keep stock particles out of stuffing box, give you longer sleeve and packing life.

9. ADJUST IMPELLER FROM OUTSIDE. Maintain proper clearance between impeller and casing with external axial adjustment.

For further information on the Fig. 3135 stock pump, including performance curves, write for Bulletin 723.1.

MEMBER

Goulds PUMPS INC. Seneca Falls New York

Branches: Atlanta • Boston Chicago • Houston New York • Philadelphia Pittsburgh • Tulsa

West Coast Representative: Goulds Pumps Western, Portland, Ore.

In Canada: The A. R. Williams Machinery Co., Ltd. in all principal cities.

PULP & PAPER CHEMICALS COLUMN

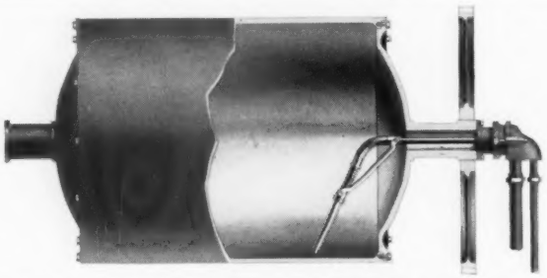
Grace's Polymer Chemicals

Within a year after organization, Grace's Polymer Chemicals Division opened its new offices, technical service and research labs of its polyethylene manufacturing division, at Clifton, N.J.

Polymer will make high density linear polyethylene, possessing greater strength and heat resistance than conventional polyethylene. Tradenamed Grex, it will be made in Grace's new Baton Rouge plant near "our most important raw material source, ethylene gas made by Esso Standard Oil Co." Grace has invested $20 million.

Triples Natural Gum

Morningstar, Nicol recently dedicated new plant facilities in Hawthorne, N.J., which will triple its production potential and double floor space for grinding, blending, treating and compounding water soluble gums and inaugurate an air-convection system for specialty starch and gum blending.



ENGINEERED TO STAY PUT

The Midwest Auto-flex Syphon features a spring and brace that holds the end of the pipe at the proper distance from the bottom of the dryer. The pipe cannot possibly take any other position —hence, proper water and air removal.

The cantilever leverage exerted is less than half that exerted by bent pipe syphons. In the Midwest, the pipe clears the dryer and creates no drag on the journal. Fits all steam joints and remains effective at low as well as at high operating speeds.

Order a few for trial and quit worrying about syphon troubles.

ROSS MIDWEST FULTON CORP., Dayton, Ohio, U.S.A.

Subsidiary of J. O. Ross Engineering Corp., New York, N. Y.

Representatives:

James Brinkley, Seattle; Clark & Vicario, North Tarrytown, N. Y.;

Ross Engineering of Canada Limited, Montreal.

STOP TELESCOPING ROLLS MUSHROOMING CORES

Use Air Operated HORTON Clutches and Brakes to control the sheet tension on your winders and back stands. Take the guess work out of tensioning and let HORTON equipment give you uniform tight rolls all the time.

VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

HORTON MFG. CO., INC.

MINNEAPOLIS 14, MINNESOTA

Higher Whites

By using a combination of dyes and an optical brightener, Sandoz, Inc. has developed a formula for obtaining clearer, more brilliant whites on bleached papers. Dyes are fast to light and strength of combined colorants and brightening agents is said to prove economical for mill runs.

Corrosion Resistant Saraloy

Corrosion resistant lining material to protect metal components of chemical process systems has been developed by The Dow Chemical Co. Saraloy 898 is an elastomeric copolymer based on vinylidene chloride. It is a flexible thermoplastic with extraordinary resistance to a broad range of acids, alkalis, salt solution and solvents.

New Clay Operation

American Industrial Clays, Inc., is setting up new clay mining and processing operation at Sandersville (kaolin center of the world), Ga. Facilities comprise one of world's richest known reserves. Major output will be for paper.

Staff for Polyethylene

Brea Chemicals, Inc., subsidiary of Union Oil Co. of California, has set up a national plastic sales organization to introduce new polyethylene plastic materials.

Increased Alum Supply

Calcining facilities at Bauxite, Ark., to treat bauxite ore from American Cyanamid's Quapaw deposit, will provide an increased supply of ore for making aluminum sulfate at nine domestic Cyanamid plants. Cyanamid produces about one third of nation's supply of alum.

New Paper Coating

Pliolite VT, a new coating resin soluble in mineral spirits and developed specifically as a solution binder for coatings, has been developed by the Chemical Division of Goodyear Tire and Rubber Co. Features: quick-drying, film-forming properties; chemical and abrasion resistant.

British Columbia Firm Affiliates with Griffith

Western Plastics & Coatings, Ltd., of New Westminster, B.C., has become an affiliate of Griffith Rubber Mills, Portland, Ore., announces Zina A. Wise, president of the Portland firm. The new affiliate in Canada offers complete roll covering service, rubber and other chemically resistant linings and coatings, and plastic pipe and fittings.

New Gulf States Offices

Gulf States Paper Corp., which will be producing market bleached kraft pulp at Demopolis, Ala., this summer, has opened new offices for its EZ Pulp Sales Division at 230 Park Ave., New York 17, N.Y. Phone is Murray Hill 3-2810. District manager of pulp sales is L. Walter Lawrence.

Old Seattle Firms Merge

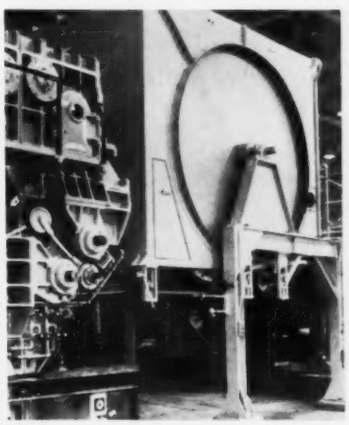
Two established and well-known architectural and engineering offices in Seattle, Wash., have joined forces under the name of Nickum, Lamont and Fey, according to the principals, George C. Nickum, managing partner of W. C. Nickum and Sons, and Daniel Lamont, A.I.A., and Lester Fey, A.I.A., of Lamont and Fey. Offices are 71 Columbia St., Seattle 4.

The firm of Lamont and Fey recently designed a plant for the Pacific Coast Paper Mills in Bellingham, Wash.

Reynolds Joins Valley Iron

George Edward Reynolds has joined Valley Iron Works Co., Appleton, Wis., as chief engineer. He has many years experience in this field. He was sales and specification engineer with Rice Barton Corp., chief design engineer with Nekoosa-Edwards, and in earlier years was with Valley Iron and Beloit.

AIR COOLER

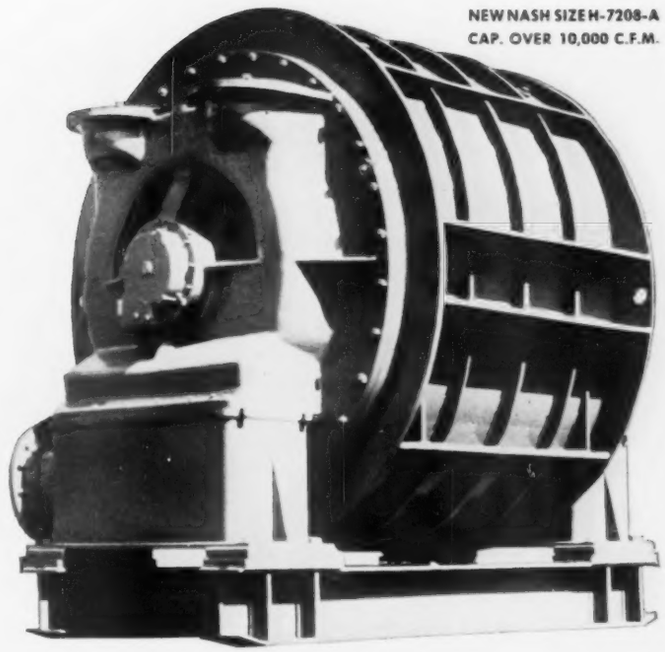


FOR
WEYERHAEUSER'S
COSMOPOLIS PULP DRYER

DESIGNED AND MANUFACTURED BY
JAMES BRINKLEY
COMPANY
417 9th AVE., SO. SEATTLE 4, WN.

AGITATORS·CONVEYORS
CUSTOM BUILT MACHINERY

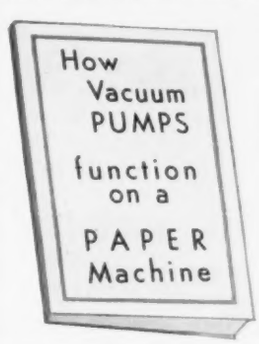
NEW NASH SIZE H-7208-A
CAP. OVER 10,000 C.F.M.



If three days lost production on a paper machine amounts to more than the cost of Vacuum Pumps, dependability is the prime factor in pump selection.

Over a thousand leading mills depend on Nash Vacuum Pumps to insure continuous production. Nash Pumps are built sturdy enough to stand the pounding of continuous production. They are simple. They have no internal parts in wearing contact. They will handle slugs of water or stock. They are designed to operate at the low speeds necessary for long life and reliability. Don't gamble with your production. Install Nash Vacuum Pumps and be safe.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONN. U.S.A.



Of equal interest to Management and to Machine Operators is this informative booklet just published. A copy will be mailed to you free upon request.

Name_____

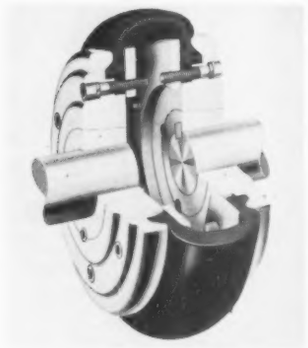
Address_____

City_____

State_____

PULP & PAPER New Equipment and Supplies

New Flexible Cushion Coupling



An import from West Germany, Para-flex, a flexible coupling "based upon a new concept," was introduced at a press showing for industrial magazine editors in Chicago by Dodge Mfg. Corp., Mishawaka, Ind., with Harry A. Torson, v.p. for sales, Fred Ebeling, gen. sales mgr., and Jackson Chung, chief development engineer, discussing the new equipment with aid of working models, pictures, etc.

Heart of the Para-flex coupling, invented by Stromag, at Una, West Germany, is a tire with synthetic tension members bonded together in rubber. It was made possible by technological advances in manufacture of tires with rayon, nylon or dacron cord. The four-way flexing body of Para-flex outperforms the most complex coupling mechanisms, yet operates with the simplicity and dependability of a modern tire. Two German steel mills have made general use of the couplings. They are recommended for high speed, hard usage pulp and paper machinery of all kinds.

The tire is clamped between two hubs, mounted on the shafts to be coupled. The flexible member is held between flanges and clamp rings of the hubs. Both hubs are machined to take Taper-Lock bushings.

According to Dodge, Para-flex will take angular mis-alignment up to four degrees, parallel mis-alignment up to ⅛ in., and end-float up to 5/16 in.—contingent upon size of the coupling and the duration of conditions—or all these simultaneously. The resilience of the flexible member cushions shocks to a remarkable degree. Torsional vibration developed by internal combustion engines, is absorbed to a great degree.

Because there is no metal-to-metal contact in the Para-flex coupling, it requires no lubrication. No maintenance or regular inspection for lubrication is needed. It is available from stock in capacities up to 600 hp at 900 rpm. Dodge has rights in U.S., Canada and Mexico.

New Plastic Pipe Union

The first plastic 3-in. screwed pipe union has been introduced by Walworth Co., 60 East 42nd St., New York, N. Y. The large union, made of highly corrosion resistant rigid polyvinyl chloride, increases PVC piping application possibilities which have been limited by the availability of only smaller sized unions. PVC piping systems are used to handle corrosive fluids in the pulp and paper industry.

The new 3-in. union is available with threaded or solvent-weld socket-type ends in either high- or normal-impact PVC.

Expands Fork Truck Line

Clark Equipment Co., Battle Creek, Mich., has expanded its "Ranger" line of fork trucks for off-the-road handling with addition of the Ranger 150, a pneumatic-tire model of 15,000 lbs. capacity. Features: four-wheel drive, power steering, power shifting and an oscillating rear axle. Specially designed for operation through heavy mud and over rough terrain. A single level manipulates four-wheel or two-wheel drive.

Tractor Power Steering

Of particular advantage in operating tractors when equipped with front-end loaders or other heavy front-mounted equipment, power steering is the latest advancement in the John Deere (Moline, Ill.) line of tractors and equipment. Unit is available for factory or field installation on "420" Utility and "420" Special Utility tractors.

CLAYS

AMERICAN — ENGLISH

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation

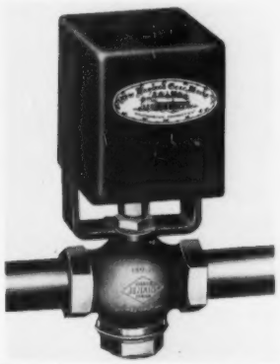
551 Fifth Avenue, New York 17, N.Y.

New Lift Check Valve

The first all-polyvinyl chloride lift check valve is now on the market in commercial quantities. It was designed and introduced by Tube Turns Plastics, Inc., Louisville, Ky., at the request of piping engineers in chemical and petroleum fields.

The new lift check valve is simple, durable and efficient, according to Carl B. McLaughlin, exec. vice president. It will operate in either a vertical or horizontal position, and open and close under less than 6 lbs. pressure. A full 100% flow area is provided. The valve's only moving part is a self-energizing disk. It is available in ½ to 3 in. sizes, and in threaded or socket welding types. The material is normal impact PVC.

Motor Operated Valve

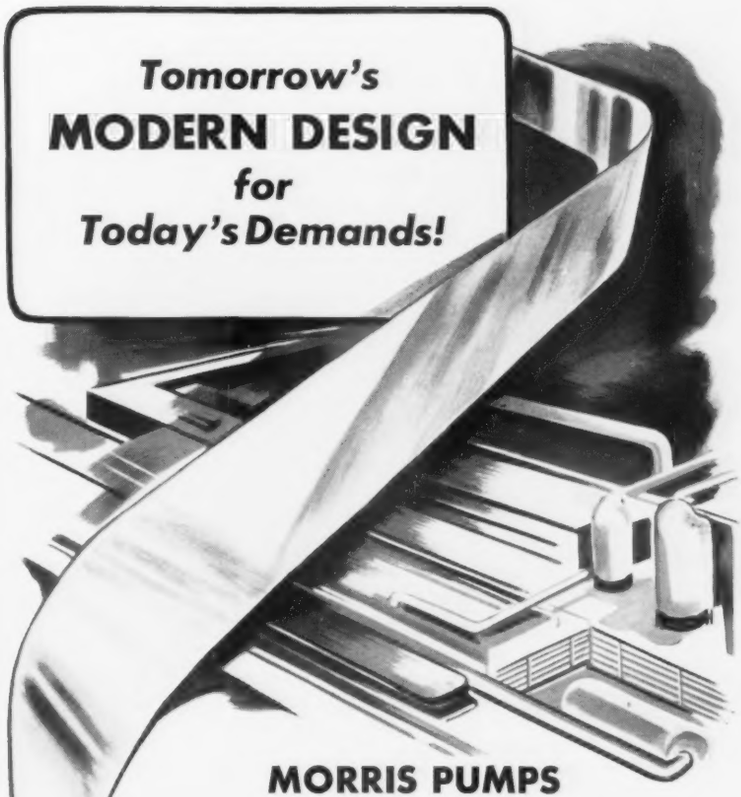


The New England Gear Works (South End Road, Southington, Conn.) motorized valve is said to incorporate many desirable features of automatic valve operation in one simplified powerful, inexpensive unit. It is available in ten sizes, Jenkins bronze globe body. Features: automatic disc compensation, extremely tight shut-off, 150 lbs. pressure capacities, no mounting restrictions, permanent lubrication, quiet positive operation without linkage, machine cut hardened steel gears.

New Grease Thickener

A new organic thickener is used in a line of industrial greases introduced by Standard Oil Co. (Indiana). The non-soap thickener is the result of a five-year research program at its Whiting, Ind., laboratories. Four regular greases and three extreme pressure grades are available under the trade name of Rykon. The new thickener makes greases more stable than any previously used gelling agent, according to the company. Capillary action of the fibers in the thickening agent holds the oil. The greases are especially useful where high temperature or excessive moisture conditions prevail.

Tomorrow's
MODERN DESIGN
for
Today's Demands!



MORRIS PUMPS

keep the aluminum industry rolling toward

GREATER CAPACITY

In pace with the far-sighted aluminum industry, other leading manufacturers the country over shrewdly specify Morris for heavy duty pumping.

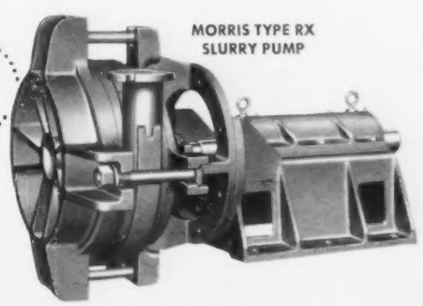
The Morris Type RX Slurry Pump is rugged, dependable, and trouble free. It's specifically designed for heavy pumping; gives peak performance under all conditions, including heavy, coarse or fine slurries, dispersions and sludges.

The Morris pump operates with minimum attention . . . lowers maintenance costs . . . can be quickly dismantled for inspection . . . avoids lengthy lay-up time. For heavy duty pumping . . . specify Morris.

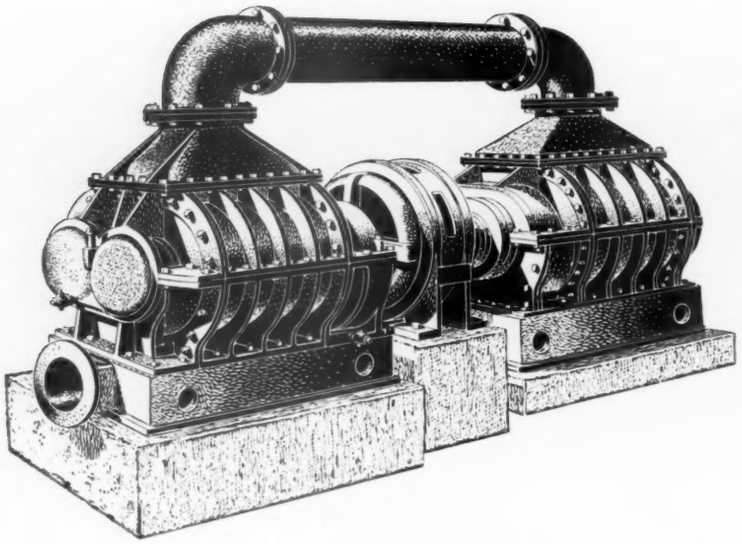
WRITE TO MORRIS TODAY for recommendations of the pump best suited to your size, capacity, specifications. Ask for Bulletin 185.

MORRIS
CENTRIFUGAL
PUMPS

MORRIS TYPE RX
SLURRY PUMP



MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities



R-C high speed vacuum pumps cost less to install and operate

Outstanding performance over many years in hundreds of applications in paper and other process industries have built a strong preference for Roots-Connersville vacuum pumps.

- Reduced horsepower at higher speeds (600 rpm and up) saves as much as 25% in power and lowers the cost of motors.
- Minimum sealing water required, from 4 to 40 gpm. Performance is unaffected by water temperature.
- Straight spur gears permit operation without axial thrust, reducing maintenance and holding downtime to a minimum.
- Internal parts readily accessible for inspection without disturbing impeller clearances.
- Compact units require small floor space and less expensive foundations.

R-C vacuum pumps are supplied in single-stage or compound units to meet any capacity requirement. For specification data, write for Bulletin 50-B-13.

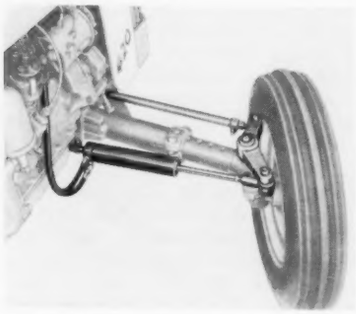
Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

757 Willow Avenue, Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.

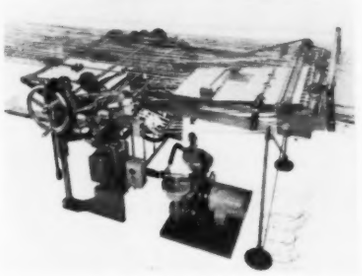
Variable Speed Drive Increases Range



A variable speed drive for slotter shafts that increases by 22% the range of large model printer-slotters is now available on 64x144-in. and 64x160-in. models of Langston Printer-Slotters. The drive is mounted on an extension, outside the machine frame, of the upper slotter shaft. It rotates the upper slotter shaft at reduced speed in part of its rotation and a board speed when cutting the slots.

The developments made possible slotting of box blanks that previously could only be processed on large plain rotary slotters and combines the capacity of big rotary slotter and the Printer-Slotter.

Improved Paper Inserter



A new improved Hickok Combination Pile Inserter now makes it possible to automatically insert paper, blotters or board between any number of sheets of paper from 4 up to 125 or more, with equal ease and accuracy. The changeover from handling lightest manila paper to chipboard is quickly accomplished by the push of a button. No mechanical changes are necessary.

For inserting paper smoothly and efficiently, suction is used. For inserting board or blotters, which frequently have uneven or warped surfaces, a rubber push finger is used. The new inserter is available with suction, or push finger attachment, or both, so that one machine can efficiently insert either paper or board. For more information write C. M. Buffington, W. O. Hickok Mfg. Co., Box 423, Harrisburg, Pa.

48" SWECO Separators Screen 1,800 Lb. of Slurry in 25 Minutes for Mead Paper

SWECO Vibrating Screen Separators are screening starch slurry at a unit rate of 1,800 lb. (485 gallons) every 25 minutes for the Mead Corporation of Chillicothe, Ohio and Kingsport, Tenn. The 48" diameter units have stepped up Mead's production of high-quality white paper by processing six to eight batches of slurry apiece in an eight-hour shift.

This 48" diameter SWECO *Separator screens up to eight batches of starch slurry a day to speed production of Mead Corporation's quality white paper.*

The SWECO Separators are equipped with 150-mesh (.0041" opening) stainless steel wire cloth. They have replaced processing screens of 60 mesh or less that slowed down effective removal of dirt from the starch.

Mead Corporation mill operators find the SWECO Separators easy to maintain and simple to clean. SWECO's unique design permits effective cleaning by flushing with steam and hot water.

A second 48" SWECO Separator was installed as part of an expansion program at the Chillicothe mill.

Screening Analysis and Recommendations Available

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These Boilers are completely dismantled and will be sold in a group or singly, as customers may desire. The boilers and equipment are in very excellent condition and will make a very good buy for anyone who has a use for a 3-Drum Bent Tube Low Head Boiler. Each Boiler is rated at 50,000 lbs. steam per hour. **(If interested, write direct to Chief Engineer, Groveton Papers Company, Groveton, New Hampshire.)**

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Riegel Paper Corporation
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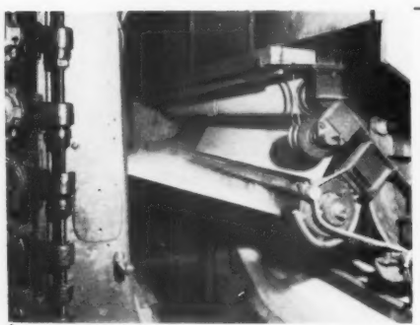

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Dr. Behrend Passes

Dr. Otto F. Behrend, co-founder and treasurer for 55 years and former v.p. of Hammermill Paper Co., passed away May 20. He was 84. Dr. Behrend was born in Coeslin, Pomerania, East Germany. He received his ph.d. degree in chemistry from the University of Berlin in 1896. He and his brother, Ernst, aided and encouraged by their father, Moritz, founded the Hammermill Paper Co. in what had been a wheat field along Lake Erie. Dr. Behren helped supervise construction.

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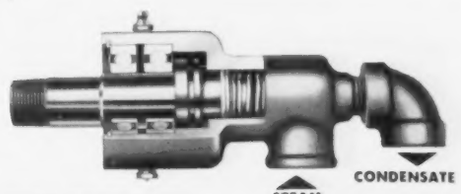

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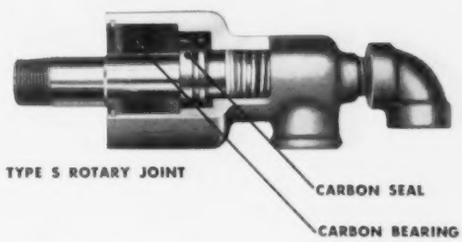

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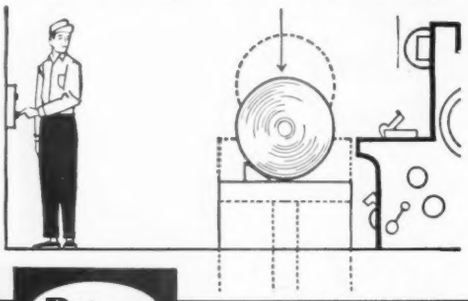

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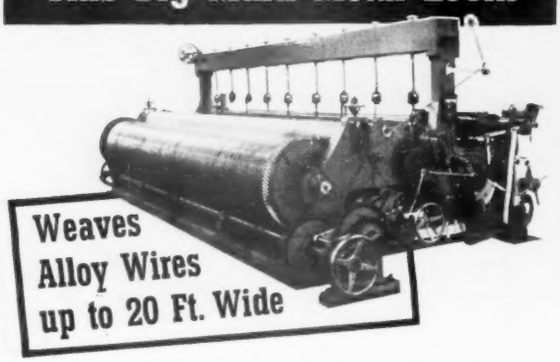

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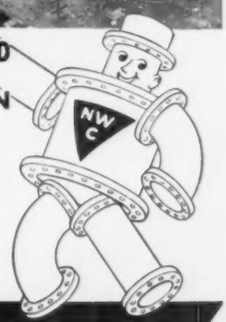

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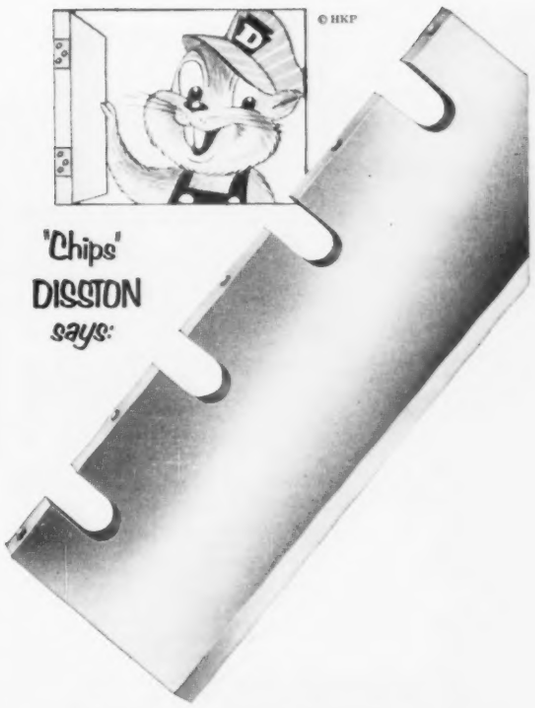

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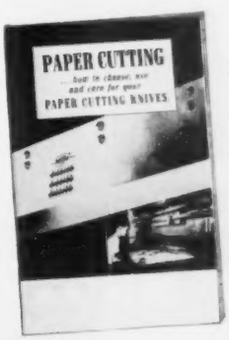

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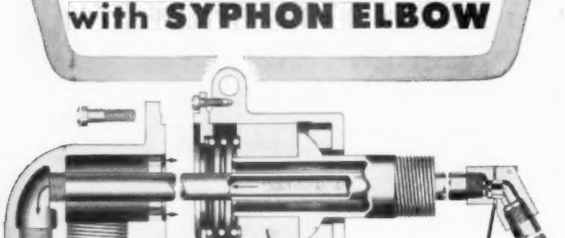
Johnson Joint

SELF-SUPPORTED TYPE

with SYPHON ELBOW



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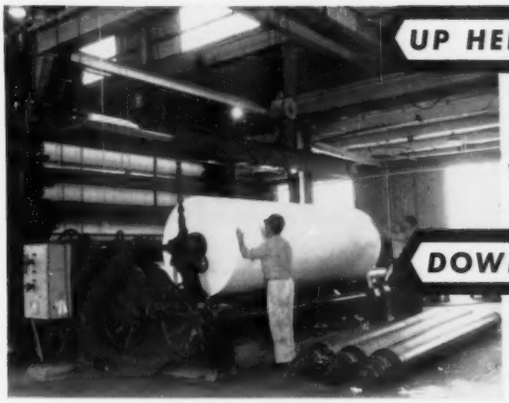

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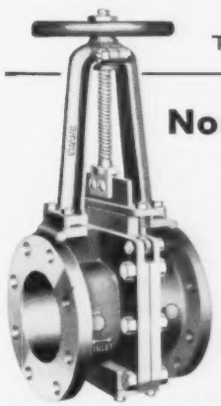

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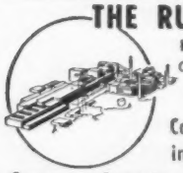
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ADVERTISERS' INDEX

YOUR GUIDE TO EQUIPMENT • MATERIALS • SERVICES

Adell Chemical Co. 64
Alaskan Copper Works 149
Allis-Chalmers Mfg. Co. 143
American Hoist & Derrick Co. 99
American Potash & Chemical Corp. 81
Anheuser-Busch, Inc. 165
Appleton Machine Co. 65
Appleton Wire Works, Inc. 67
Appleton Wood Products 171
Asten-Hill Mfg. Co. .. inside back cover

Babcock & Wilcox Co. 153
Badger Machine Co. 133
Bailey Meter Co. 70
Baltimore & Ohio Railroad 151
Bauer Bros. Co. 147
Bird Machine Co. 2
Black-Clawson Co. 18-19
John W. Bolton & Sons, Inc. 115
James Brinkley Co. 161
Buffalo Pumps 72
Bulkley Dunton Organization 75

Carthage Machine Co. 92
Chain Belt Co. 82
Chemipulp Process Inc. 156
Ciba Co., Inc. 158
Classified Advertising 166
Cleveland Worm & Gear Co. 10
Crane Co. 171

Deere & Co. 121
DeZurik Corp. 149
Dilts Machine Works 18-19
Henry Disston Div., H. K. Porter Co. 169
Dominion Engineering Co. Ltd. ... 141
Dorr-Oliver, Inc. 62-63
Draper Brothers Co. 171
J. H. Dupasquier 166
E. I. Du Pont de Nemours & Co., Inc. 76-77

Ebasco Services, Inc. 168
Emerson Mfg. Co. 115
English China Clays Sales Corp. .. 162
Euclid Crane & Hoist Co. 171

Falk Corp. 66
Fate-Root-Heath Co. 134
Filer & Stowell Co. 107
Fischer & Porter Co. 17
Fitchburg Screen Plate Co. 170
Ford Motor Co. 129
Foxboro Co. 74

Goulds Pumps Inc. 159
Griffith Rubber Mills 16
Gulf States Paper Corp., E-Z Pulp Sales Div. 71

Hoffman Construction Co. 52
Homelite Corp. 84
Hooker Electrochemical Co. 51
Horton Mfg. Co. 160
Hyster Co. 145

Improved Machinery Inc. 117
International Harvester Co. 103

G. D. Jenssen Co., Inc. 171
Johnson Corp. 170
E. D. Jones & Sons Co. 12-13

Knox Woolen Co. 170

Link-Belt Co. 148
Link-Belt Speeder Corp. 88

Mall Tool Co. 95
Manchester Machine Co. 68
Merrick Scale Mfg. Co. 171
Mixing Equipment Co., Inc. 80
Monsanto Chemical Co. 8
Morris Machine Works 163
Multi-Metal Wire Cloth Co., Inc. .. 168
D. J. Murray Manufacturing Co. ... 86

Nash Engineering Co. 161
Naylor Pipe Co. 54
Nitrose Co., Inc. 168
Nopco Chemical Co. 78
Northwest Copper Works, Inc. 169
Northwest Filter Co. 60

Ohio Knife Co. 170
Oliver Corp. 138
Owen Bucket Co. 146

Pandia, Inc. 18-19
Panalarm, Div. of Panellit 155
Panellit, Inc. 155
Pennsalt of Washington Div. 73
Perkins-Goodwin Co. ..... back cover
Pettibone Mulliken Corp. 124
Pioneer Saws, Div. of Outboard Marine Corp. 111
Puget Sound Pulp & Timber Co. .. 69
Pulp Bleaching Co. 171

Rader Pneumatics, Inc. 152
Chas. P. Raymond Service 166
Reliance Electric & Engineering Co. 6
Remington Arms Co., Inc. 95
Rice Barton Corp. 1
Ridge Tool Co. 157
Roots-Connersville Blower Div. ... 164
Ross Midwest Fulton Corp. 160
Rotary Lift Co. 168
W. G. Rovang & Associates, Inc. .. 57

Sealol Corp. 167
Shafer Bearing Div. 82
Shartle Bros. Machine Co. 18-19
Shuler & Benninghofen 167
Ray Smythe Co. 170
Soderhamn Machine Mfg. Co. 137
Solvay Process Div. 15
Southwestern Engineering Co. 165
Stebbins Engineering & Mfg. Co. ..... inside front cover
Stowe-Woodward, Inc. 4

Tennessee Corp. 154
Texas Gulf Sulphur Co. 59
Thew Shovel Co. 127
Titanium Pigment Corp. 55

Union Asbestos & Rubber Co. 56
U.S. Rubber Co. 61

R. T. Vanderbilt Co. 20
Vollrath Co. 169

Walworth Co. 58
Warner & Swasey Co. 146
West End Chemical Co. 53
Western Machinery Co. 156
Weyerhaeuser Timber Co. 79
Williams-Gray Co. 146
Wisconsin Wire Works 171

Yarnall-Waring Co. 14

CONSULTANTS & ENGINEERS 172

Calkin & Bayley, Inc.
Central States Engineering
Engineering Products Co. Inc.
John G. Hood & Assoc.
Alvin H. Johnson & Co.
Lockwood Greene Engineers
Lummus Co.
Chas. T. Main, Inc.
Roderick O'Donoghue & Co.
Rust Engineering Co.
C. D. Shy & Co.
J. E. Sirrine Co.
Stevenson & Rubens
Stone & Webster Engineering Corp.
Swanson Wright & Co., Engineers
Tree Farm Management Service

The LAST WORD — PULP & PAPER EDITORS' PAGE

RRG KAJ

LHB

RR

WHP SFL

New Assignments, New Faces

Just a few PULP & PAPER family notes this month, so you can catch up on some changes which, we hope, will bring you a bigger and better magazine.

Louis H. Blackerby, who has been covering mills on the Columbia River and its major tributaries—a mighty big area in itself—takes over as Pacific Northwest editor. We have our doubts as to whether that's a big enough title for LHB, as his roaming and responsibility will extend over Northern California, Oregon, Washington, Idaho, Montana, British Columbia and Alaska.

Charles L. Shaw, Canadian editorial director for PULP & PAPER since 1943, continues as resident editor in Vancouver, B.C., but he takes on other duties in Miller Freeman Publications, so will share field work with LHB.

LHB was born at Sanger, Calif., May 31, 1913. He qualified for public school teaching, instead went to work as a "pond monkey" at an Oregon sawmill, then got serious about it, and earned a b.s. degree in forestry at Oregon State. This took him until 1939 because he had to keep the lumber company job to pay for school. He tried log scaling. But winter closed the camp down and he covered his first assignment for PULP & PAPER by calling at the Camas, Wash., mill in May 1940. During 40 months of wartime service in the Army Forest Engineers, he expedited lumber production in the French Alps and the Philippines. During the past 17 1/2 years, excepting war service, he served *The Lumberman* as well as P&P. Now he is full time on P&P, with much larger territory.

Raul Rodriguez, not really a newcomer to PULP & PAPER, will cover the booming and expanding Southern California industry. Born in beautiful Guatemala City, March 6, 1905, he has been a Southern Californian since 1913—when he was 8 years old. "Rod" used to edit travel and building magazines. Being a fanatic for "highbrow" English saddle riding, he joined the U.S. cavalry in the war, stayed till his age—not the horse's—honorably discharged him. RR has been with Miller Freeman Publications since 1944.

Stuart F. Leete, district manager for PULP & PAPER in California, headquarters in San Francisco, will have as his assistant, Willis H. (Bill) Pearson. Stu, of course, is one of the veterans of Miller Freeman Publications, his services to PULP & PAPER and other publications dating back to 1930. A graduate of Stanford and an ex-newspaperman, he served in Naval Intelligence in World War II.

This industry is not new to Bill Pearson. For he was born and raised in the "paper town" of Neenah, Wis., and he is brother of W. Irwin Pearson, executive secretary of the Wisconsin Paper Group, pool car shippers for 35 paper companies.

Roy R. Grundy, another newcomer to PULP & PAPER, previously got his feet wet in this industry. He joins Ralph David's staff as sales representative out of Chicago after a year and a half as sales assistant with Inland Container Corp. He also worked a year at Container Laboratories, Inc., Chicago. Roy is 27 years old, a graduate in industrial engineering from Illinois Institute of Technology and he attended University of Chicago night school for a master's degree in business. His father, an engineer, has been associated with this industry on many projects.

Kenneth A. Johnson, assistant sales manager in Chicago, moves on to a new PULP & PAPER office in Cleveland, 4500 Euclid Ave. KAJ, born and raised on a farm in Wisconsin, a former staff man at Nekoosa-Edwards Paper Co., has been with P&P over four years. He now sets forth on larger and greater assignments for this magazine. His activities will take him in a larger territory extending from Ohio, West New York and Pennsylvania into the South.

Pioneer of Modern Wood Use Trends

A pioneer of some of the most significant trends today in the forest products industries, suddenly has departed from this world and from activities that were revolutionizing our concepts of forest conservation and utilization.

R. S. Wertheimer, vice president-general manager of Longview Fibre Co. for the past 17 of his 57 years, had not yet received the recognition nationally that he merited for his pioneering work. It was true that he was honored and recognized in the Far West, and in a short time he might have earned wider recognition in North America.

It was a Sunday—May 19—and he was on the job at the mill, when he died, suddenly.

Longfibre, conceived by his father—the late M. A. Wertheimer, a former president of Thilmany Pulp & Paper Co. at Kaukauna, Wis., was established in 1926 at Longview, Wash., and started the following year as the first West Coast mill subsisting on sawmill wastes. R. S. Wertheimer, known as "Bob" to associates everywhere, left his assistant engineer's job with Thilmany to become engineer of Longfibre. He was a graduate of MIT. With production start-up in 1927 he was promoted to resident manager and became vice president in 1940.

The original Longview unit established a new pattern by operating 100% on residue wood from sawmills. Today Longfibre is rated at 1,100-tons per day, utilizing wood residues for 90-95% of its needs.

Mr. Wertheimer took a leading part in industry activities and at time of his death was president of the Pacific Coast Assn. of Pulp & Paper Mfrs.

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